Working document presented in the ICES Working Group on Southern horse mackerel, Anchovy and Sardine (WGHANSA). On-line meeting, 24-28 May 2021.

# Acoustic assessment and distribution of the main pelagic fish species in ICES Subdivision 9a South during the *ECOCADIZ 2020-07* Spanish survey (August 2020).

By

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## ABSTRACT

The present working document summarises the main results obtained from the *ECOCADIZ 2020-07* Spanish (pelagic ecosystem-) acoustic-trawl survey conducted by IEO between 01st and 14th August 2020 in the Portuguese and Spanish shelf waters (20-200 m isobaths) off the Gulf of Cadiz (GoC) onboard the R/V *Miguel Oliver*. The 21 foreseen acoustic transects were sampled. A total of 26 valid fishing hauls were carried out for echo-trace ground-truthing purposes. Four additional night trawls were conducted to collect anchovy hydrated females (DEPM-adult *ad hoc* sampling). Chub mackerel was the most frequent captured species in the fishing hauls, followed by mackerel, anchovy, horse mackerel, bogue, sardine, blue jack mackerel and Mediterranean horse mackerel. Round sardinella, longspine snipefish, Atlantic pomfret and transparent goby showed a very low occurrence, whereas the occurrence of boarfish and pearlside was incidental. Chub mackerel, anchovy and sardine showed the highest yields in these hauls. The estimate of total NASC allocated to the "pelagic fish species assemblage" has shown a slight decrease in relation to the historical records in 2018 and 2019, mainly caused by the regional decrease in Spanish waters. However, both total and regional estimates are still above their respective historical averages. Such estimates are the result of the relatively high acoustic contributions of anchovy, sardine (both mainly in Spanish waters), and chub mackerel (in Portuguese waters). GoC anchovy was widely distributed in the surveyed area, showing the highest densities between Cape Santa Maria and Bay of Cadiz. Anchovy acoustic estimates in summer 2020 were of 5153 million fish and 44 877 tones, with the bulk of the population occurring in the Spanish waters. The population was composed by fishes not older than 2 years, with age-0 fish contributing 75% of the total population. The largest (and oldest) fish were distributed in the westernmost waters and the smallest (and youngest) ones concentrated in the surroundings of the Guadalquivir river mouth and adjacent shallow waters. The current biomass estimate becomes in the second historical maximum within the time-series. GoC sardine distributed almost all over the surveyed area (avoiding the Spanish easternmost waters), but was mainly concentrated between west Cape Santa Maria and the Bay of Cadiz, especially in the Spanish central waters of the Gulf, where numerous dense mid-water schools were recorded in the coastal fringe (20-40 m depth). The estimates of sardine abundance and biomass in summer 2020 were 1923 million fish and 50 721 t, estimates close to the historical average, but lower than the values estimated last year and the most recent maxima reached in 2018. Although up to 5-year olds were recorded in the population, age-0 juveniles accounted for 71% of the total numbers, mainly occurring in relatively shallow waters along the coastal fringe comprised between Tinto-Odiel river mouth and the Bay of Cadiz. Chub mackerel was widely distributed in the surveyed area, mainly in the central and western shelf waters, although the highest densities occurred in the western Algarve. A total of 32 854 t and 448 million fish were estimated for Chub mackerel, estimates similar to the most recent ones and very close to the time-series average. Age-0 and age-1 groups were the dominant age groups and mainly occurring in the Portuguese waters. The oldest fish (3-5 years) occurred almost exclusively in Spanish waters.

## INTRODUCTION

The *ECOCADIZ* surveys constitute a series of yearly acoustic-trawl surveys conducted since 2004 by IEO in the Subdivision 9a South (Algarve and Gulf of Cadiz, between 20 – 200 m depth) under the "pelagic ecosystem survey" approach. The series was conducted onboard R/V *Cornide de Saavedra* until 2013, since 2014 on it was conducted onboard R/V *Miguel Oliver*. This series started in 2004 with the *BOCADEVA 0604* pilot combined acoustic - anchovy DEPM survey. The following surveys within this new series (named *ECOCADIZ* since 2006 onwards) are planned to be routinely performed on a yearly basis, although the series, because of the available ship time, has shown until 2014 some gaps in those years coinciding with the conduction of the triennial anchovy DEPM survey (the true *BOCADEVA* series, which first survey started in 2005).

Results from the *ECOCADIZ* series are routinely reported to ICES Expert Groups on both stock assessment (formerly in WGMHSA, WGANC, WGANSA, at present in WGHANSA) and acoustic and egg surveys on anchovy and sardine (WGACEGG).

The present Working Document reports the main results from the *ECOCADIZ 2020-07* survey, namely the acoustic estimates of abundance and biomass (age-structured for anchovy, sardine and chub mackerel) and the spatial distribution of the assessed species.

## MATERIAL AND METHODS

The *ECOCADIZ 2020-07* survey was carried out between 01$^{st}$ and 14$^{th}$ August 2020 onboard the Spanish R/V *Miguel Oliver* covering a survey area comprising the waters of the Gulf of Cadiz, both Spanish and Portuguese, between the 20 m and 200 m isobaths. The survey design consisted in a systematic parallel grid with tracks equally spaced by 8 nm, normal to the shoreline (**Figure 1**).

Echo-integration was carried out with a *Simrad™ EK60* echo sounder working in the multi-frequency fashion (18, 38, 70, 120, 200 kHz). Average survey speed was about 10 knots and the acoustic signals were integrated over 1-nm intervals (ESDU). Raw acoustic data were stored for further post-processing using *Echoview™* software package. Acoustic equipment was previously calibrated during the *MEDIAS 2020* acoustic survey, a survey conducted in the Spanish Mediterranean waters just before the *ECOCADIZ* one, following the standard procedures (Demer *et al*., 2015).

Survey execution and abundance estimation followed the methodologies firstly adopted by the ICES *Planning Group for Acoustic Surveys in ICES Sub-Areas VIII and IX* (ICES, 1998) and the recommendations given by the *Working Group on Acoustic and Egg Surveys for Small Pelagic Fish in NE Atlantic* (WGACEGG; ICES, 2006a,b).

Fishing hauls for echo-trace ground-truthing were opportunistic, according to the echogram information. Hauls PE01 to PE28 were carried out using a ca. 15 m-mean vertical opening pelagic trawl (*Tuneado* gear). At the end of PE28 the *Tuneado* gear suffered a serious breakage because a hooking with an undetected obstacle over the bottom. Fishing hauls PE29 and PE30 were carried out with a *Gloria HOD 352* pelagic trawl gear (ca. 10 m-mean vertical opening net). All the fishing hauls were performed at an average speed of 4-4.5 knots. Gear performance and geometry during the effective fishing was monitored with *Simrad™ Mesotech FS20* trawl sonar and a *Marport™ NBTE* (Narrow Band Trawl Eye) sensor. Trawl sonar and sensors data from each haul were recorded and stored for further analyses.

Ground-truthing haul samples provided biological data on species and they were also used to identify fish species and to allocate the back-scattering values into fish species according to the proportions found at the fishing stations (Nakken and Dommasnes, 1975).

Length frequency distributions (LFD) by 0.5-cm class were obtained for all the fish species in trawl samples (either from the total catch or from a representative random sample of 100-200 fish). Only those LFDs based on a minimum of 30 individuals and showing a normal distribution were considered for the purpose of the acoustic assessment.

Individual biological sampling (length, weight, sex, maturity stage, stomach fullness, and mesenteric fat content) was performed in each haul for anchovy, sardine, mackerel and horse-mackerel species, and bogue. Otoliths were dissected from anchovy, sardine and chub mackerel sampled specimens.

The following TS/length relationship table was used for acoustic estimation of assessed species (following recent IEO standards after ICES, 1998 and recommendations by ICES, 2006a,b. $b_{20}$ values for transparent goby and Atlantic pomfret following to Foote, 1987 for physoclists):

| Species | $b_{20}$ |
|---|---|
| **Sardine (*Sardina pilchardus*)** | -72.6 |
| **Round sardinella (*Sardinella aurita*)** | -72.6 |
| **Anchovy (*Engraulis encrasicolus*)** | -72.6 |
| **Chub mackerel (*Scomber japonicus*)** | -68.7 |
| **Mackerel (*S. scombrus*)** | -84.9 |
| **Horse mackerel (*Trachurus trachurus*)** | -68.7 |
| **Mediterranean horse-mackerel (*T. mediterraneus*)** | -68.7 |
| **Blue jack mackerel (*T. picturatus*)** | -68.7 |
| **Bogue (*Boops boops*)** | -67.0 |
| **Transparent goby (*Aphia minuta*)** | -67.5 |
| **Atlantic pomfret (*Brama brama*)** | -67.5 |
| **Blue whiting (*Micromesistius poutassou*)** | -67.5 |
| **Silvery lightfish/pearlside (*Maurolicus muelleri*)** | -72.2 |
| **Longspine snipefish (*Macroramphosus scolopax*)** | -80.0 |
| **Boarfish (*Capros aper*)** | -66.2* (-72.6) |

*Boarfish $b_{20}$ estimate following to Fässler *et al*. (2013). Between parentheses the usual IEO value considered in previous surveys.

The *PESMA 2010* software (J. Miquel, unpublished) has got implemented the needed procedures and routines for the acoustic assessment following the above approach.

The *Continuous Underway Fish Egg Sampler* (CUFES) was not used in the survey since it was used in the previous *BOCADEVA 0720* anchovy DEPM survey. A *Sea-bird Electronics™ SBE 21 SEACAT* thermosalinograph and a *Turner™ 10 AU 005 CE Field* fluorometer were used during the acoustic tracking to continuously monitor some biological (ichthyoplankton and *in vivo* fluorescence) and hydrographical variables (sub-surface sea temperature and salinity). Vertical profiles of hydrographical variables were also recorded by night from 158 CTD casts distributed in 15 transects by using *Sea-bird Electronics™ SBE 911+ SEACAT* (with coupled *Datasonics* altimeter, *SBE 43* oximeter, *WetLabs ECO-FL-NTU* fluorimeter and *WetLabs C-Star 25 cm* transmissometer sensors) and *LADCP T-RDI WHS* 300 kHz profilers (**Figure 2**). *VMADCP RDI 150 kHz* records were also continuously recorded by night between CTD stations.

Information on presence and abundance of sea birds, turtles and mammals was also recorded during the acoustic sampling by one onboard observer.

A detailed description of protocols and methods followed in this survey series is reported in Doray *et al*. (2021).

**RESULTS**

**Acoustic sampling**

The acoustic sampling started on 01st August in the coastal end of the transect RA01 and finalized on 11th August in the oceanic end of the transect RA21 (**Table 1, Figure 1**). Transects were acoustically sampled in the E-W direction. The whole 21-transect sampling grid was sampled. The acoustic sampling usually started at 06:00 UTC although this time might vary depending on the duration of the previous works related with the hydrographic sampling.

**Groundtruthing hauls**

Twenty six (26) fishing operations, all of them being considered as valid ones according to a correct gear performance and resulting catches, were carried out (**Table 2**, **Figure 3**).

As usual in previous surveys, some fishing hauls were attempted by fishing over an isobath crossing the acoustic transect as close as possible to the depths where the fishing situation of interest was detected over that transect. In this way the mixing of different size compositions (*i.e.*, bi-, multi-modality of length frequency distributions) was avoided as well as a direct interaction with fixed gears. The mixing of sizes is more probable close to nursery-recruitment areas and in regions with a very narrow continental shelf. This type of hauls is also conducted in depths showing hard and/or very irregular bottoms or when the echotraces to be identified either are very scarce or very located in the bathymetric gradient. Given that all of these situations were not very uncommon in the sampled area, 27% of valid hauls (7 hauls) were conducted over isobath.

All the pelagic hauls were carried out like a bottom-trawl haul, with the ground rope working over or very close to the bottom, because of many echo-traces usually occurred close to the bottom. According to the above, the sampled depth range in the valid hauls oscillated between 36-191 m.

During the survey were captured 2 Chondrichthyan, 40 Osteichthyes, 3 Cephalopod, 1 Crustacean and 1 Cnidarian-Hydrozoa species. The percentage of occurrence of the more frequent fish species (chondricthyans excluded) in the trawl hauls is shown in the enclosed **text table below** (see also **Figure 4**). The table includes all the species under study and also those species with a higher occurrence than the former ones. The pelagic ichthyofauna was the species set most frequently captured and the one composing the bulk of the overall yields of the catches. Within this pelagic fish species set, chub mackerel was the most frequent captured species (26 hauls, 100% presence index), followed by mackerel (23 hauls, 88%), anchovy (21 hauls, 81%), horse mackerel (20 hauls, 77%), bogue (17 hauls, 65%), sardine (15 hauls, 58%), blue jack mackerel (12 hauls, 46%) and Mediterranean horse mackerel (6 hauls, 23%). Round sardinella, longspine snipefish, Atlantic pomfret and transparent goby showed a very low occurrence (3 hauls, 12%), whereas the occurrence of boarfish and pearlside (1 haul, 4%) was incidental. Blue whiting was absent in the catches.

For the purposes of the acoustic assessment, anchovy, sardine, round sardinella, mackerel species, horse & jack mackerel species, bogue, snipefish, boarfish and pearlside were initially considered as the survey target species. All of the invertebrates, and both bentho-pelagic (*e.g.*, manta rays) and benthic fish species (*e.g.*, flatfish, gurnards, etc.) were excluded from the computation of the total catches in weight and in number from those fishing stations where they occurred. Catches of the remaining non-target species were included in an operational category termed as "*Others*".

According to the above premises, during the survey were captured a total of 20.9 tonnes and 1.1 million fish (**Table 3**). 39% of this fished biomass corresponded to anchovy, 29% to chub mackerel, 23% to sardine,

3% to horse mackerel, and contributions lower than 3% to the remaining species. The most abundant species in ground-truthing trawl hauls was also anchovy (72%), followed by sardine (19%) and chub mackerel (8%), with the remaining species showing lower contributions than 0.3%.

The species composition, in terms of percentages in number, in each valid fish station is shown in **Figure 5**. A first impression of the distribution pattern of the main species may be derived from the above figure. Thus, anchovy was captured all over the surveyed area, although the highest yields were recorded between eastern Algarve and Spanish central waters. The size composition of anchovy catches confirms the usual pattern exhibited by the species in the area during the survey season, with the largest fish inhabiting the westernmost and easternmost waters and the smallest ones concentrated in the surroundings of the Guadalquivir river mouth and adjacent shallow waters (**Figure 5**). Sardine catches also showed widely distributed along the surveyed area, but showing the highest yields in three spots located in the surroundings of the Bay of Cadiz, central waters of the Gulf and Cape Santa María. The largest sardines were captured in the Portuguese waters, whereas juvenile sardines were mainly captured in the shallowest hauls conducted in the coastal fringe between Tinto-Odiel river mouth and the Bay of Cadiz (**Figure 6**). Chub mackerel, horse mackerel, blue jack mackerel and bogue, although they occurred in a great part of the study area, only showed relatively high yields in the Portuguese waters. Conversely, mackerel recorded the highest yields in Spanish waters. Mediterranean horse mackerel was restricted to the central and easternmost Spanish waters. The size composition of these last species in fishing hauls is shown in **Figures 7** to **16**.

| Species | OCCURRENCE (Number of valid hauls) | OCCURRENCE (% over Total valid hauls) | Total weight (Kg) | Total number |
|---|---|---|---|---|
| *Scomber colias* | 26 | 100,00 % | 6124,053 | 92522 |
| *Merluccius merluccius* | 24 | 92,31 % | 78,230 | 679 |
| *Scomber scombrus* | 23 | 88,46 % | 54,274 | 390 |
| *Engraulis encrasicolus* | 21 | 80,77 % | 8150,282 | 805650 |
| *Trachurus trachurus* | 20 | 76,92 % | 300,078 | 3877 |
| *Boops boops* | 17 | 65,38 % | 172,764 | 1297 |
| *Alosa fallax* | 16 | 61,54 % | 24,489 | 94 |
| *Sardina pilchardus* | 15 | 57,69 % | 4823,831 | 211225 |
| *Spondyliosoma cantharus* | 14 | 53,85 % | 127,919 | 817 |
| *Trachurus picturatus* | 12 | 46,15 % | 35,099 | 534 |
| *Pagellus erythrinus* | 9 | 34,62 % | 91,251 | 539 |
| *Diplodus annularis* | 7 | 26,92 % | 4,158 | 65 |
| *Trachurus mediterraneus* | 6 | 23,08 % | 582,839 | 3015 |
| *Diplodus vulgaris* | 6 | 23,08 % | 210,017 | 1437 |
| *Trachinus draco* | 5 | 19,23 % | 1,470 | 11 |
| *Pagellus acarne* | 4 | 15,38 % | 26,933 | 116 |
| *Diplodus bellottii* | 4 | 15,38 % | 5,192 | 72 |
| *Sardinella aurita* | 3 | 11,54 % | 70,874 | 379 |
| *Macroramphosus scolopax* | 3 | 11,54 % | 8,250 | 1136 |
| *Brama brama* | 3 | 11,54 % | 4,070 | 4 |
| *Pagellus bellottii bellottii* | 3 | 11,54 % | 11,435 | 73 |
| *Aphia minuta* | 3 | 11,54 % | 0,270 | 742 |
| *Spicara flexuosa* | 3 | 11,54 % | 4,371 | 102 |
| *Pomatomus saltatrix* | 2 | 7,69 % | 0,775 | 2 |
| *Chelidonichthys lucerna* | 2 | 7,69 % | 0,315 | 2 |
| *Xenodermichthys copei* | 1 | 3,85 % | 10,000 | 62 |
| *Maurolicus muelleri* | 1 | 3,85 % | 0,081 | 67 |
| *Belone belone belone* | 1 | 3,85 % | 1,405 | 2 |
| *Zenopsis conchifer* | 1 | 3,85 % | 0,210 | 1 |
| *Capros aper* | 1 | 3,85 % | 3,830 | 784 |
| *Mugil cephalus* | 1 | 3,85 % | 1,750 | 1 |
| *Caranx rhonchus* | 1 | 3,85 % | 0,565 | 4 |
| *Trachinotus ovatus* | 1 | 3,85 % | 0,230 | 1 |
| *Pomadasys incisus* | 1 | 3,85 % | 0,570 | 5 |
| *Pagellus bogaraveo* | 1 | 3,85 % | 0,075 | 1 |
| *Diplodus puntazzo* | 1 | 3,85 % | 0,360 | 1 |
| *Dentex gibbosus* | 1 | 3,85 % | 8,765 | 1 |
| *Sparus aurata* | 1 | 3,85 % | 0,815 | 2 |
| *Mullus surmuletus* | 1 | 3,85 % | 0,120 | 1 |
| *Stromateus fiatola* | 1 | 3,85 % | 0,775 | 1 |
| *Chelidonichthys obscurus* | 1 | 3,85% | 0,09 | 1 |

**Back-scattering energy attributed to the "pelagic assemblage" and individual species**

A total of 322 nmi (ESDU) from 21 transects has been acoustically sampled by echo-integration for assessment purposes. From this total, 211 nmi (11 transects) were sampled in Spanish waters, and 111 nmi (10 transects) in the Portuguese waters. The enclosed text table below provides the nautical area-scattering coefficients attributed to each of the selected target species and for the whole "pelagic fish assemblage".

| $S_{A\,(m^2\,nmi^{-2})}$ | Total spp. | PIL | SAA | ANE | MAC | VMA | HOM | HMM | JAA | BOG | BOC | SNS | MAV |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total Area** | 184301 | 43118 | 2028 | 64869 | 6 | 44927 | 5415 | 16096 | 1143 | 1849 | 124 | 227 | 4499 |
| **(%)** | (100.0) | (23.4) | (1.1) | (35.2) | (0.003) | (24.4) | (2.9) | (8.7) | (0.6) | (1.0) | (0.1) | (0.1) | (2.4) |
| **Portugal** | 61499 | 12983 | 0 | 7245 | 1 | 32915 | 5090 | 0 | 1141 | 1312 | 124 | 227 | 461 |
| **(%)** | (33.4) | (30.1) | (0.0) | (11.2) | (22,2) | (73,3) | (94.4) | (0.0) | (99.8) | (70.9) | (100.0) | (100.0) | (10.2) |
| **Spain** | 122802 | 30135 | 2028 | 57623 | 5 | 12012 | 325 | 16096 | 2 | 537 | 0 | 0 | 4038 |
| **(%)** | (66.6) | (69.9) | (100.0) | (88.8) | (77.8) | (26.7) | (6.0) | (100.0) | (0.2) | (29.1) | (0.0) | (0.0) | (89.8) |

For this "pelagic fish assemblage" has been estimated a total of 184 301 $m^2$ $nmi^{-2}$, an acoustic energy which has experienced a slight decrease in relation to the time-series maxima recorded in 2018 and 2019 both for this total and for the Spanish contribution. Even so, these values are above the historical average (**Figure 17**). Portuguese waters accounted for 33% of this total back-scattering energy and the Spanish waters the remaining 67%. However, given that the Portuguese sampled ESDUs were almost the half of the Spanish ones, the (weighted-) relative importance of the Portuguese area (*i.e.*, its density of "pelagic fish") is actually much higher. The mapping of the total back-scattering energy is shown in **Figure 17**. By species, anchovy (35%), chub mackerel (24%) and sardine (23%), were the most important species in terms of their contributions to the total back-scattering energy. Mediterranean horse mackerel (9%), horse mackerel (3%), pearlside (2%) and round sardinella and bogue (1% each), were the following species in importance. The remaining species contributed with less than 1%.

Some inferences on the species' distribution may be carried out from regional contributions to the total energy attributed to each species: sardine, round sardinella, anchovy, mackerel, Mediterranean horse mackerel, and pearlside seemed to show greater densities in the Spanish waters, whereas chub mackerel, blue jack mackerel, horse mackerel, bogue, boarfish and snipefish could be considered as typically "Portuguese species" in this survey.

According to the resulting values of integrated acoustic energy, the species acoustically assessed in the present survey finally were anchovy, sardine, mackerel, chub mackerel, blue jack mackerel, horse mackerel, Mediterranean horse mackerel, bogue, boarfish, longspine snipefish and pearlside.

**Spatial distribution and abundance/biomass estimates**

**Anchovy**

Parameters of the survey's length-weight relationship for anchovy are given in **Table 4**. The back-scattering energy attributed to this species and the coherent post-strata considered for the acoustic estimation are mapped in **Figure 18**. The estimated abundance and biomass by size class and age group are given in **Tables 5** and **6**, and **Figures 19** and **20**.

Anchovy (35% of the total NASC attributed to fish) was widely distributed in the surveyed area, showing the highest densities between Cape Santa Maria and Bay of Cadiz (**Figure 20**). The *PELAGO 20* spring survey not recorded the species to the west of Cape Santa Maria.

Twelve (12) coherent post-strata have been differentiated according to the $S_A$ value distribution and the size composition in the fishing stations (**Figure 18**). The acoustic estimates by homogeneous post-stratum and total area are shown in **Table 5** and **Figure 19**. Overall acoustic estimates in summer 2020 were 5153 million fish and 44 877 tonnes. By geographical strata, the Spanish waters yielded 91% (4714 million) and 83% (37 114 t) of the total estimated abundance and biomass in the Gulf, confirming the importance of these waters in the species' distribution. The estimates for the Portuguese waters were 439 million and 7773 t. The current biomass estimate (44 877 t) becomes in the second historical maximum within the time-series (historical maximum in 2019: 57 700 t; **Figure 45**). The *PELAGO 20* spring Portuguese survey previously estimated for this same area 49 787 t and 5639 million (Portuguese waters: 1789 t, 89 million; Spanish waters: 47 998 t, 5550 million).

The size class range of the assessed anchovy population in summer 2020 varied between the 7.0 and 18.0 cm size classes, with two modal classes, the main mode at 11.5 cm and a secondary mode at 9.5 cm. The size composition of anchovy throughout the surveyed area confirms the usual pattern exhibited by the species during the survey season, with the largest (and oldest) fish being distributed in the westernmost waters and the smallest (and youngest) ones concentrated in the surroundings of the Guadalquivir river mouth and adjacent shallow waters (**Table 5, Figure 19;** see also **Figure 5**).

The 2020 summer estimates of mean size and weight of the whole population (11.0 cm, 8.7 g) were somewhat lower than their respective time-series averages (12.3 cm, 12.6 g). As it has been occurring in the last years, a relatively high contribution of the small fish (ca. 40 % of the total population is composed by fish ≤10 cm) during the survey season might be the cause of the value of such estimates in 2020.

The population was composed by fishes not older than 2 years. As it has been happening in the last years, during the 2020 survey some recruitment (age 0 fish) has also been recorded, probably as a consequence of the delayed survey dates. In fact, age 0 fish accounted for 74% and 57% of the total estimated abundance and biomass, respectively. Age 1 fish represented 26% and 41% of the total abundance and biomass (**Table 6**; **Figure 20**).

**Sardine**

Parameters of the survey's size-weight relationship for sardine are shown in **Table 4**. The back-scattering energy attributed to this species and the coherent post-strata considered for the acoustic estimation are shown in **Figure 21**. Estimated abundance and biomass by size class and age group are given in **Tables 7** and **8** and **Figures 22** and **23**.

Sardine recorded a relatively high acoustic echo-integration in summer 2020 (23% of the total NASC attributed to pelagic fish species assemblage), as a consequence of the occurrence of dense mid-water schools in the coastal fringe (20-40 m depth) of the Spanish central waters of the Gulf (**Figure 21**). This distribution pattern of acoustic densities was quite similar to the recorded one during the *PELAGO* survey in spring, although acoustic detections were weaker during *ECOCADIZ*, especially in the western Algarve. Thus, sardine distributed almost all over the surveyed area (avoiding the Spanish easternmost waters), but was mainly concentrated between west Cape Santa Maria and the Bay of Cadiz.

Eight (8) size-based homogeneous sectors were delimited for the acoustic assessment (**Figure 21**). The estimates of Gulf of Cadiz sardine abundance and biomass in summer 2020 were 1923 million fish and 50 721 t, estimates close to the historical average (ca. 1955 million; 50 kt), but lower than the values estimated last year and the most recent maxima reached in 2018 (114 631 t; see **Figure 45**). Spanish waters

concentrated 71% and 62% of the total estimated abundance and biomass, respectively (2495 million and 44 899 t). The estimates for the Portuguese waters were 554 million and 19 464 t. The *PELAGO 20* spring Portuguese survey previously estimated for this same area the triple of biomass and abundance than the estimated later in summer by *ECOCADIZ*, 155 017 t (6547 million): 47 415 t (1024 million) in Portuguese waters and 107 602 t (5523 million) in Spanish waters, with similar regional relative contributions.

Sizes of the assessed sardine population in summer 2020 ranged between 8.5 and 21.5 cm size classes. The length frequency distribution of the population was clearly bimodal, with one main mode at 14.0 cm size class and a secondary one at 17.0 cm (**Table 7**, **Figure 22**). The juvenile fraction in the estimated population (≤11.5 cm), was mainly located in relatively shallow waters along the coastal fringe comprised between Tinto-Odiel river mouth and the Bay of Cadiz. (**Table 8**, **Figure 23;** see also **Figure 6**). The 2020 summer estimates of mean length and weight of the whole population (14.7 cm, 26.4 g) have experienced an increase in relation to the last year's estimates. Mean length in summer 2020 is close to the historical average (15.0 cm) and mean weight is higher than the historical mean value (22.5 g), a probable consequence of the relative importance of the abovementioned secondary modal component in the estimated population biomass.

The population was composed by fishes not older than 5 years, with the 71% of the estimated numbers belonging to the age group 0 (56% of the estimated biomass; **Table 8**; **Figure 23**). Age 1 sardines accounted for 17% and 25% of the abundance and biomass of the whole population, respectively. Age 0 sardines occurred almost exclusively in Spanish waters (83% of the age 0 fish estimated in the entire Gulf), where they also were the dominant age group (83% and 71% of abundance and biomass). Although 0 to 5 year olds were also present in the Portuguese waters, the population was mainly distributed between the 0 and 3 age groups. Age 0 fish was also the main age group in those waters (41% in abundance and 30% in biomass), but it was not so dominant as in the Spanish waters, with the regional contributions of the 2 and 3 year olds to the estimated Portuguese fraction of the population abundance being 33% and 23%.

**Round sardinella**

Parameters of the survey's length-weight relationship are shown in **Table 4**. The distribution of the back-scattering energy attributed to this species and the coherent post-strata considered for the acoustic estimation are shown in **Figure 24**. Estimated abundance and biomass by size class are given in **Table 9** and **Figure 25**.

Round sardinella (1% of the total NASC) showed very low densities, mainly restricted to the easternmost coastal waters in the Gulf (**Figure 24**; see also **Figure 7**).

Two (2) size-based homogeneous post-strata were delimited for the acoustic assessment (**Figure 24**). The estimates of round sardinella abundance and biomass in summer 2020 were 26 million fish and 4838 t (**Table 9**). Spanish waters concentrated the whole estimated population.

The size class range of the assessed population varied between the 22.0 and 34.5 cm size classes, with two modal classes, the main one at 30.0 cm and a secondary mode at 25.5 cm (**Table 9**, **Figure 25**).

**Mackerel**

Parameters of the survey's length-weight relationship are shown in **Table 4**. The distribution of the back-scattering energy attributed to this species and the coherent post-strata considered for the acoustic estimation are shown in **Figure 26**. Estimated abundance and biomass by size class are given in **Table 10** and **Figure 27**.

Atlantic mackerel (0.003% of the total NASC) showed a relatively wide distribution all over the surveyed area, but showing somewhat higher densities in Spanish waters (**Figure 26**). Sub-adult/juvenile fish were mainly recorded in outer shelf of west Algarve and the Spanish central and easternmost waters, whereas larger fish occurred in shallower waters (**Figure 8**).

Eight (8) size-based homogeneous post-strata were delimited for the acoustic assessment (**Figure 26**). The estimates of Atlantic mackerel abundance and biomass in summer 2020 were 1 million fish and 230 t (**Table 10**). Spanish waters concentrated 79% and 74% of the total estimated abundance and biomass, respectively (1 million and 171 t). The estimates for the Portuguese waters were 0.3 million and 59 t.

The size class range of the assessed population varied between the 16.0 and 34.5 cm size classes, with two modal classes, the main one at 28.5 cm and a secondary mode at 18.0 cm (**Table 10**, **Figure 27**).

**Chub mackerel**

Parameters of the survey's length-weight relationship are shown in **Table 4**. The distribution of the back-scattering energy attributed to this species and the coherent post-strata considered for the acoustic estimation are shown in **Figure 28**. Estimated abundance and biomass by size class and age group are given in **Tables 11** and **12** and **Figures 29** and **30**.

Chub mackerel was widely distributed in the surveyed area, mainly in the central and western shelf waters, although the highest densities occurred in the western Algarve (**Figure 28**).

Sixteen (16) size-based homogeneous sectors were delimited for the acoustic assessment (**Figure 28**). The estimates of Gulf of Cadiz chub mackerel abundance and biomass in summer 2020 were 448 million fish and 32 854 t. These estimates and the most recent ones showed a relative stable recent trend, with biomasses very close to the historical average (ca. 35 kt; see **Figure 45**). Portuguese waters concentrated the bulk of the population (356 million and 24 495 t). The estimates for the Spanish waters were 92 million and 8358 t.

Sizes of the assessed population ranged between 15.0 and 35.5 cm size classes. The length frequency distribution of the population showed two modes, the main mode at 19.0 cm size class and a secondary one at 21.0 cm (**Table 11**; **Figure 29**). Larger fish were located in Portuguese waters, although the largest ones were recorded in the coastal waters in front Matalascañas. Smaller sub-adult fish were found in the Spanish outer shelf waters (**Figures 9** and **29**).

The population was composed by fishes not older than 5 years, with the 48% (217 million fish) and 41% (183 millions) of the estimated numbers belonging to the age-0 and age-1 groups, respectively (36% and 45% of the estimated biomass, 11 988 t and 14 636 t, respectively; **Table 12**; **Figure 30**). About 80% of the 0- and 1-year old fish occurred in Portuguese waters. Conversely, the whole of the population fraction belonging to the age-group 3 and older occurred in Spanish waters.

**Blue jack-mackerel**

The survey's length-weight relationship for this species is given in **Table 4**. The distribution of the back-scattering energy attributed to this species and the coherent post-strata considered for the acoustic estimation are illustrated in **Figure 31**. Estimated abundance and biomass by size class are given in **Table 13** and **Figure 32**.

The species (0.6% of the total NASC) restricted almost exclusively to Algarve shelf waters, with spots of higher densities in the westernmost waters (**Figure 31**). The species' spatial distribution resembles the horse mackerel distribution. Larger fish seems to be more frequent in Portuguese waters (**Figure 10**).

Three (3) size-based homogeneous sectors were delimited for the acoustic assessment (**Figure 31**). The estimates of Gulf of Cadiz Blue Jack mackerel abundance and biomass in summer 2020 were 14 million fish and 838 t. Portuguese waters concentrated the bulk of the population (13 million and 837 t). The estimates for the Spanish waters were 0.02 million and 1 t only.

Sizes of the assessed population ranged between 15.5 and 25.5 cm size classes. The length frequency distribution of the population showed one single mode at 19.5 cm size class (**Table 13**; **Figure 32**).

**Horse mackerel**

The survey's length-weight relationship for horse mackerel is shown in **Table 4**. The distribution of the back-scattering energy attributed to this species and the coherent post-strata considered for the acoustic estimation are shown in **Figure 33**. Estimated abundance and biomass by size class are given in **Table 14** and **Figure 34**.

Horse mackerel (3% of the total NASC) showed a quite similar distribution pattern to the abovementioned one for blue jack mackerel, with the species being almost absent in the Spanish shelf and showing relatively higher densities in the shelf area comprised between Cape San Vicente and Cape Santa Maria (**Figure 33**). Juveniles occurred in the Spanish outer shelf central waters (**Figure 11**).

Eight (8) size-based homogeneous sectors were delimited for the acoustic assessment (**Figure 34**). The estimates of Gulf of Cadiz horse mackerel abundance and biomass in summer 2020 were 53 million fish and 4065 t. Portuguese waters concentrated the bulk of the population (94% in terms of abundance and biomass, 50 million and 3837 t). The estimates for the Spanish waters were 3 million and 228 t.

Sizes of the assessed population ranged between 11.5 and 32.5 cm size classes. The length frequency distribution of the population showed two modes, the main one at 29.0 cm size class and a secondary mode at 13.5 cm size class (**Table 14**; **Figure 34**).

**Mediterranean horse-mackerel**

The survey's length-weight relationship for this species is shown in **Table 4**. The distribution of the back-scattering energy attributed to this species and the coherent post-strata considered for the acoustic estimation are illustrated in **Figure 35**. Estimated abundance and biomass by size class are given in **Table 15** and **Figure 36**.

Mediterranean horse mackerel (9% of the total NASC) was a typically Spanish species in summer 2020 (as usual). The species distributed as far as the Tinto-Odiel river mouth, mainly over the inner-mid shelf waters with the population mainly being composed by adult fish (**Figures 12** and **35**).

Four (4) size-based homogeneous sectors were delimited for the acoustic assessment (**Figure 36**). The estimates of Mediterranean horse mackerel abundance and biomass in summer 2020 were 86 million fish and 16 200 t. As described above, the population was restricted to the Spanish waters.

The size class range of the assessed population varied between the 21.0 and 36.0 cm size classes, outstanding a main one at 29.0 cm size class (**Table 15**, **Figure 36**).

**Bogue**

Parameters of the survey's length-weight relationship for bogue are shown in **Table 4**. The distribution of the back-scattering energy attributed to this species and the coherent post-strata considered for the

acoustic estimation are shown in **Figure 37**. Estimated abundance and biomass by size class are given in **Table 16** and **Figure 38**.

Bogue (1% of the total NASC), although widely distributed, showed higher densities in the west Algarve waters (**Figure 38**). Larger fish occurred in Spanish waters (**Figure 13**).

Seven (7) size-based homogeneous sectors were delimited for the acoustic assessment (**Figure 37**). The estimates of Gulf of Cadiz bogue abundance and biomass in summer 2020 were 10 million fish and 1301 t. Portuguese waters concentrated the bulk of the population (78% in terms of abundance and 66% in biomass, namely, 8 million and 3837 t). The estimates for the Spanish waters were 3 million and 858 t. The estimates for the Spanish waters were 2 million and 443 t.

Sizes of the assessed population ranged between 16.5 and 33.5 cm size classes. The length frequency distribution of the population showed two modes, the main one at 22.0 cm size class and a secondary mode at 28.5 cm size class (**Table 16**; **Figure 38**).

**Longspine snipefish**

The survey's length-weight relationship for this species is shown in **Table 4**. The distribution of the back-scattering energy attributed to this species and the coherent post-strata considered for the acoustic estimation are shown in **Figure 39**. Estimated abundance and biomass by size class are given in **Table 17** and **Figure 40**.

*M. scolopax* (0.1% of the total NASC) showed an incidental occurrence in the surveyed area, mainly restricted to the westernmost Algarve outer shelf waters, like boarfish, and also close to the Cape Santa Maria (**Figures 14** and **39**).

Two (2) size-based homogeneous sectors were delimited for the acoustic assessment (**Figure 39**). The estimates of longspine snipefish abundance and biomass in summer 2020 were 105 million fish and 786 t. The estimated population was restricted to the Portuguese waters only.

Sizes of the assessed population ranged between 10.0 and 14.5 cm size classes. The length frequency distribution of the population showed one single mode at 11.0 cm size class (**Table 17**; **Figure 40**).

**Boarfish**

Parameters of the survey's length-weight relationship for boarfish are shown in **Table 4**. The distribution of the back-scattering energy attributed to this species and the coherent post-strata considered for the acoustic estimation are shown in **Figure 41**. Estimated abundance and biomass by size class are given in **Table 18** and **Figure 42**.

Boarfish (0.1% of the total NASC) showed an incidental occurrence in the westernmost Algarve outer shelf waters (**Figures 15** and **41**).

One (1) size-based homogeneous sector was delimited for the acoustic assessment (**Figure 41**). The estimates of boarfish abundance and biomass in summer 2020 in the Gulf of Cadiz shelf waters were 8 million fish and 38 t only. The estimated population was restricted to the Portuguese waters only.

Sizes of the assessed population ranged between 4.5 and 9.0 cm size classes. The length frequency distribution of the population showed one single mode at 6.0 cm size class (**Table 18**; **Figure 42**).

**Pearlside**

The survey's length-weight relationship for this species is shown in **Table 4**. The distribution of the back-scattering energy attributed to this species and the coherent post-strata considered for the acoustic estimation are shown in **Figure 43**. Estimated abundance and biomass by size class are given in **Table 19** and **Figure 44**.

Pearlside (2% of the total NASC) was only detected in the oceanic limit of the acoustic transects, just in the upper slope. More common in Spanish waters (**Figures 16** and **43**).

Four (4) size-based homogeneous sectors were delimited for the acoustic assessment (**Figure 43**). The estimates of pearlside abundance and biomass in summer 2020 in the Gulf of Cadiz shelf waters were 1370 million fish and 1814 t. Spanish waters concentrated the bulk of the population (87% in terms of abundance and biomass, namely, 1192 million and 1579 t). The estimates for the Portuguese waters were 178 million and 235 t.

Sizes of the assessed population ranged between 4.0 and 6.0 cm size classes. The length frequency distribution of the population showed one single mode at 5.5 cm size class (**Table 19**; **Figure 44**).

**(SHORT) DISCUSSION**

The total NASC estimated in this survey for "pelagic fish assemblage", 184 301 $m^2$ $nmi^{-2}$, is the third highest estimate ever recorded within the time-series (**Figure 17**), a situation which was repeated in the last two years' surveys. In the current survey such an increase in acoustic energy is again the result of the relatively high partial contributions of anchovy, sardine and chub mackerel (as was also the case of the last two years). Anchovy contributed with 35% of the total NASC allocated to the pelagic fish assemblage, with the Spanish waters accounting 89% of the species' NASC. Sardine still showed during the 2020 summer survey the occurrence of dense schools in the coastal (20-40 m) waters in the central part of the Gulf (between the Guadiana river mouth and Doñana).

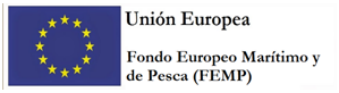
The current anchovy biomass estimate (44 877 t), although experienced a slight decrease in relation to the last year, becomes in the second historical maximum within the time-series (after reaching the historical maximum in 2019: 57 700 t; see **Figure 45**). The spring *PELAGO 20* survey estimated, however, increased biomass population levels (49 787 t) in relation to those recorded the last year (29 876 t).

The estimates of Gulf of Cadiz sardine abundance and biomass in summer 2020 were 1923 million fish and 50 721 t, a biomass very close to the historical average (ca. 50 kt), but lower than the biomass estimated the previous two years (114 631 t in 2018 and 62 682 t in 2019, **Figure 45**). The *PELAGO 20* spring Portuguese survey previously estimated for this same area the triple of biomass and abundance than the estimated later in summer by *ECOCADIZ*, 155 017 t (6547 million). Again *PELAGO* and *ECOCADIZ* exhibit an opposite trend for this last year in the series.

Chub mackerel acoustic estimates were of 448 million fish and 32 854 t, with the bulk of the population concentrated in the Portuguese waters. The biomass estimates showed a relative stable recent trend, with the recent biomasses very close to the historical average (ca. 35 kt; **Figure 45**).

**ACKNOWLEDGMENTS**

We are very grateful to the crew of the R/V *Miguel Oliver* and to all the scientific and technical staff participating in the present survey.




This survey has been funded by the EU through the European Maritime and Fisheries Fund (EMFF) within the National Program of collection, management and use of data in the fisheries sector and support for scientific advice regarding the Common Fisheries Policy.

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**Table 1.** *ECOCADIZ 2020-07 s*urvey. Descriptive characteristics of the acoustic tracks.

| Acoustic Track | Location | Date | Start | | | | End | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Latitude | Longitude | UTC time | Mean depth (m) | Latitude | Longitude | UTC time | Mean depth (m) |
| **R01** | Cape Trafalgar | 02/08/20 | 36º 12,880’ N | 06º 08,840’ W | 6:06 | 24 | 36º 02,160’ N | 06º 28,870’ W | 9:48 | 220 |
| **R02** | Sancti-Petri | 02/08/20 | 36º 08,898’ N | 06º 34,152’ W | 10:44 | 175 | 36º 19,490’ N | 06º 14,670’ W | 16:40 | 24 |
| **R03** | Cádiz | 03/08/20 | 36º 26,702’ N | 06º 19,114’ W | 6:01 | 31 | 36º 17,111’ N | 06º 36,809’ W | 9:29 | 219 |
| **R04** | Rota | 03/08/20 | 36º 24,560’ N | 06º 40,681’ W | 10:23 | 181 | 36º 34,879’ N | 06º 21,880’ W | 14:04 | 21 |
| **R05** | Chipiona | 04/08/20 | 36º 40,394’ N | 06º 29,386’ W | 6:00 | 22 | 36º 31,176’ N | 06º 46,423’ W | 9:44 | 182 |
| **R06** | Doñana | 04/08/20 | 36º 08,078’ N | 06º 51,475’W | 10:57 | 167 | 36º 46,708’N | 06º 35,591’ W | 16:09 | 23 |
| **R07** | Matalascañas | 05/08/20 | 36º 54,385’ N | 06º 39,191’ W | 6:08 | 20 | 36º 43,948’ N | 06º 58,417’ W | 8:03 | 213 |
| **R08** | Mazagón | 06/08/20 | 37º 00,862’ N | 06º 44,971’ W | 7:35 | 23 | 36º 48,940’ N | 07º 05,670’ W | 11:35 | 268 |
| **R09** | Punta Umbría | 06/08/20 | 36º 49,737’ N | 07º 06,547’ W | 13:44 | 157 | 37º 03,920’ N | 06º 56,385’ W | 17:41 | 30 |
| **R10** | El Rompido | 07/08/20 | 37º 07,962’ N | 07º 07,192’ W | 6:32 | 20 | 36º 49,985’ N | 07º 07,201’ W | 9:56 | 218 |
| **R11** | Isla Cristina | 08/08/20 | 37º 06,847’ N | 07º 17,346’ W | 7:31 | 24 | 36º 53,310’ N | 07º 17,160’ W | 10:34 | 253 |
| **R12** | V.R. do Sto. Antonio | 08/08/20 | 36º 56,324’ N | 07,27,127’ W | 12:21 | 199 | 369º 06,420’ N | 07º 27,168’ W | 13:21 | 20 |
| **R13** | Tavira | 09/08/20 | 37º 04,465’ N | 07º 37,127’ W | 6:09 | 25 | 36º 56,929’ N | 07º 37,095’ W | 8:50 | 272 |
| **R14** | Fuzeta | 09/08/20 | 36º 55,551’ N | 07º 47,076’ W | 9:43 | 192 | 36º 59,385’ N | 07º 47,079’ W | 10:06 | 29 |
| **R15** | Cape Sta. María | 10/08/20 | 36º 55,746’ N | 07º 57,021‘ W | 6:30 | 63 | 36º 52,070’ N | 07º 57,969‘ W | 6:53 | 214 |
| **R16** | Quarteira | 10/08/20 | 36º 49,745’ N | 08º 06,883’ W | 9:36 | 200 | 37º 00,125’ N | 08º 07,056’ W | 10:41 | 35 |
| **R17** | Albufeira | 11/08/20 | 37º 02,270’ N | 08º 17,041’ W | 6:34 | 22 | 36º 49,448’ N | 08º 16,880’ W | 9:38 | 199 |
| **R18** | Alfanzina | 11/08/20 | 36º 50,239’ N | 08º 26,758’ W | 10:32 | 206 | 37º 04,522’ N | 08º 27,027’ W | 14:02 | 22 |
| **R19** | Portimao | 12/08/20 | 37º 05,982’ N | 08º 37,059’ W | 6:29 | 25 | 36º 51,512’ N | 08º 36,750’ W | 7:55 | 193 |
| **R20** | Burgau | 12/08/20 | 36º 51,947’ N | 08º 46,677’ W | 10:07 | 197 | 37º 02,731’ N | 08º 46,931’ W | 13:39 | 44 |
| **R21** | Ponta de Sagres | 12/08/20 | 36º 58,882’ N | 08º 56,783’ W | 14:51 | 31 | 36º 50,531’ N | 08º 56,601’ W | 16:30 | 216 |

**Table 2.** *ECOCADIZ 2020-07* survey. Descriptive characteristics of the fishing hauls. PE01-PE28 carried out with the *Tuneado* gear, PE29-PE30 with the Gloria HOD 352 gear. Hauls shaded in grey were conducted by night to collect anchovy hydrated females (DEPM).

| FISHING STATION | DATE | POSITION | | | | | | TIMING | | | | TRAWLED DISTANCE (nmi) | ACOUSTIC TRANSECT | ZONE/LANDMARK |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | START | | | END | | | START | END | EFFECTIVE TRAWLING | TOTAL MANEOUVRE | | | |
| | | LAT. | LON. | DEP. | LAT. | LON. | DEP. | UTC | UTC | | | | | |
| PE01 | 02-08-2020 | 36º 03.8961 N | 6º 25.4461 W | 102,2 | 36º 05.9067 N | 6º 22.1191 W | 55,44 | 08:03 | 08:51 | 00:48 | 01:10 | 3,362 | R01 | Cape Trafalgar |
| PE02 | 02-08-2020 | 36º 11.8475 N | 6º 28.3901 W | 103,57 | 36º 09.8838 N | 6º 32.3501 W | 130 | 11:40 | 12:34 | 00:54 | 01:16 | 3,758 | R02 | Sancti-Petri |
| PE03 | 02-08-2020 | 36º 17.0228 N | 6º 18.8575 W | 43,76 | 36º 14.8750 N | 6º 22.8320 W | 52,92 | 14:37 | 15:31 | 00:54 | 01:13 | 3,864 | R02 | Sancti-Petri |
| PE04 | 03-08-2020 | 36º 22.8547 N | 6º 26.3554 W | 58,23 | 36º 24.5949 N | 6º 22.9591 W | 46,77 | 06:58 | 07:43 | 00:45 | 01:08 | 3,246 | R03 | Cádiz |
| PE05 | 03-08-2020 | 36º 29.5434 N | 6º 31.7356 W | 65,79 | 36º 27.5109 N | 6º 35.2552 W | 92,08 | 11:39 | 12:27 | 00:48 | 01:09 | 3,49 | R04 | Rota |
| PE06 | 04-08-2020 | 36º 35.5284 N | 6º 38.3322 W | 70,26 | 36º 37.9722 N | 6º 33.9490 W | 39,63 | 07:09 | 08:09 | 00:59 | 01:21 | 4,291 | R05 | Chipiona |
| PE07 | 04-08-2020 | 36º 41.0306 N | 6º 46.3194 W | 95,57 | 36º 39.3219 N | 6º 50.3730 W | 127,37 | 11:42 | 12:30 | 00:48 | 01:10 | 3,681 | R06 | Doñana |
| PE08 | 04-08-2020 | 36º 43.0302 N | 6º 42.3165 W | 53,87 | 36º 41.2464 N | 6º 45.7079 W | 88,11 | 14:08 | 14:52 | 00:44 | 01:07 | 3,257 | R06 | Doñana |
| PE09 | 05-08-2020 | 36º 44.4801 N | 6º 57.2988 W | 137,9 | 36º 46.2178 N | 6º 54.3289 W | 104,29 | 08:33 | 09:15 | 00:41 | 01:13 | 2,951 | R07 | Matalascañas |
| PE10 | 05-08-2020 | 36º 44.6802 N | 6º 56.8048 W | 130,82 | 36º 45.8449 N | 6º 55.0405 W | 112,1 | 18:22 | 18:48 | 00:26 | 00:54 | 1,834 | R07 | Matalascañas |
| PE11 | 05-08-2020 | 36º 45.8382 N | 6º 54.8398 W | 111,07 | 36º 44.6895 N | 6º 57.0451 W | 131,56 | 19:37 | 20:07 | 00:30 | 00:52 | 2,111 | R07 | Matalascañas |
| PE12 | 06-08-2020 | 36º 57.2017 N | 6º 48.5350 W | 35,59 | 36º 58.9782 N | 6º 50.9701 W | 35,93 | 08:35 | 09:13 | 00:38 | 00:-01 | 2,637 | R08 | Mazagón |
| PE13 | 06-08-2020 | 36º 50.5042 N | 7º 04.0333 W | 128,16 | 36º 52.5112 N | 7º 00.5593 W | 102,5 | 11:59 | 12:46 | 00:47 | 01:11 | 3,434 | R08 | Mazagón |
| PE14 | 06-08-2020 | 36º 57.1975 N | 7º 01.1755 W | 73,22 | 36º 54.7629 N | 7º 02.6937 W | 97,87 | 15:39 | 16:18 | 00:38 | 01:03 | 2,719 | R09 | Punta Umbría |
| PE15 | 07-08-2020 | 36º 56.4820 N | 7º 07.1253 W | 95,56 | 36º 59.3737 N | 7º 07.2618 W | 67,68 | 08:01 | 08:41 | 00:39 | 01:02 | 2,89 | R10 | El Rompido |
| PE16 | 07-08-2020 | 36º 50.3188 N | 7º 07.2193 W | 190,84 | 36º 53.1177 N | 7º 07.2580 W | 117,93 | 11:14 | 11:53 | 00:39 | 01:10 | 2,795 | R10 | El Rompido |
| PE17 | 07-08-2020 | 36º 56.9920 N | 7º 01.2897 W | 73,74 | 36º 55.2672 N | 7º 02.3785 W | 91,77 | 19:45 | 20:10 | 00:25 | 00:46 | 1,931 | R09 | Punta Umbría |
| PE18 | 07-08-2020 | 36º 55.1620 N | 7º 02.3589 W | 91,65 | 36º 57.1665 N | 7º 01.1956 W | 70,77 | 20:49 | 21:19 | 00:30 | 00:48 | 2,208 | R09 | Punta Umbría |
| PE19 | 08-08-2020 | 36º 57.0655 N | 7º 17.1874 W | 104,7 | 36º 59.9715 N | 7º 17.2321 W | 82,65 | 08:55 | 09:35 | 00:40 | 01:05 | 2,902 | R11 | Isla Cristina |
| PE20 | 08-08-2020 | 37º 01.7614 N | 7º 25.4350 W | 89,05 | 37º 02.3014 N | 7º 28.6177 W | 87,27 | 14:29 | 15:04 | 00:35 | 01:10 | 2,605 | R12 | Vila Real do Santo Antonio |
| PE21 | 09-08-2020 | 37º 02.5972 N | 7º 36.0627 W | 62 | 37º 02.1297 N | 7º 37.6191 W | 64,93 | 07:45 | 08:04 | 00:18 | 00:39 | 1,331 | R13 | Tavira |
| PE22 | 09-08-2020 | 36º 56.6653 N | 7º 47.3578 W | 90,68 | 36º 58.1019 N | 7º 44.2978 W | 95,66 | 11:20 | 11:58 | 00:37 | 01:02 | 2,841 | R14 | Fuzeta |
| PE23 | 09-08-2020 | 36º 57.4293 N | 7º 37.0581 W | 163,71 | 36º 59.1574 N | 7º 37.0833 W | 102,49 | 13:17 | 13:40 | 00:23 | 00:51 | 1,726 | R13 | Tavira |
| PE24 | 10-08-2020 | 36º 53.6404 N | 7º 58.3531 W | 92,56 | 36º 53.9695 N | 7º 56.1154 W | 91,41 | 07:50 | 08:15 | 00:25 | 00:47 | 1,825 | R15 | Cape Santa María |
| PE25 | 10-08-2020 | 36º 58.8162 N | 8º 07.1766 W | 41,47 | 36º 55.7527 N | 8º 06.9198 W | 51,76 | 11:18 | 12:00 | 00:41 | 01:05 | 3,066 | R16 | Cuarteira |
| PE26 | 11-08-2020 | 36º 52.5466 N | 8º 16.9699 W | 108,93 | 36º 56.0752 N | 8º 17.0067 W | 80,39 | 07:51 | 08:40 | 00:49 | 01:12 | 3,524 | R17 | Albufeira |
| PE27 | 11-08-2020 | 36º 50.8603 N | 8º 24.8509 W | 137,47 | 36º 50.9034 N | 8º 22.8960 W | 126,03 | 11:45 | 12:06 | 00:21 | 00:53 | 1,57 | R18 | Alfanzina |
| PE28 | 11-08-2020 | 36º 59.1541 N | 8º 24.5935 W | 45,45 | 36º 59.2177 N | 8º 24.9019 W | 45,87 | 15:17 | 15:22 | 00:04 | 00:24 | 0,255 | R18 | Alfanzina |
| PE29 | 12-08-2020 | 36º 52.8229 N | 8º 36.7441 W | 115,12 | 36º 55.3597 N | 8º 36.7837 W | 98,13 | 08:15 | 08:52 | 00:36 | 01:03 | 2,534 | R19 | Portimao |
| PE30 | 12-08-2020 | 36º 56.0071 N | 8º 46.8201 W | 114,55 | 36º 52.8661 N | 8º 46.5577 W | 112,34 | 11:33 | 12:15 | 00:42 | 01:10 | 3,144 | R20 | Burgau |

**Table 3.** *ECOCADIZ 2020-07* survey. Catches by species in number (upper panel) and weight (in kg, lower panel) from valid fishing hauls.

| Fishing haul | CATCH IN NUMBERS | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ANE | PIL | SAA | MAS | MAC | HOM | JAA | HMM | BOG | BOC | SNS | MAV | OTHERS SPP | TOTAL |
| **01** | 13946 | 0 | 0 | 667 | 67 | 1228 | 2 | 0 | 1 | 0 | 0 | 0 | 120 | **16031** |
| **02** | 275 | 0 | 0 | 16807 | 21 | 1 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | **17114** |
| **03** | 0 | 0 | 356 | 77 | 0 | 0 | 0 | 964 | 3 | 0 | 0 | 0 | 291 | **1691** |
| **04** | 1613 | 35778 | 3 | 1762 | 3 | 8 | 0 | 1354 | 172 | 0 | 0 | 0 | 341 | **41034** |
| **05** | 25245 | 36359 | 0 | 548 | 53 | 1 | 0 | 0 | 18 | 0 | 0 | 0 | 108 | **62332** |
| **06** | 114750 | 421 | 0 | 9 | 8 | 9 | 0 | 56 | 34 | 0 | 0 | 0 | 119 | **115406** |
| **07** | 49868 | 0 | 0 | 120 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 50 | **50058** |
| **08** | 103187 | 8118 | 0 | 141 | 24 | 24 | 0 | 0 | 3 | 0 | 0 | 0 | 80 | **111577** |
| **09** | 77913 | 0 | 0 | 1283 | 45 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 66 | **79310** |
| **12** | 95 | 3 | 20 | 814 | 0 | 1 | 0 | 626 | 70 | 0 | 0 | 0 | 175 | **1804** |
| **13** | 79653 | 0 | 0 | 107 | 5 | 0 | 1 | 5 | 1 | 0 | 0 | 0 | 37 | **79809** |
| **14** | 60536 | 29482 | 0 | 5391 | 41 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 19 | **95471** |
| **15** | 25047 | 40324 | 0 | 883 | 6 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 36 | **66300** |
| **16** | 79633 | 10 | 0 | 149 | 18 | 10 | 1 | 0 | 0 | 0 | 0 | 67 | 45 | **79933** |
| **19** | 6004 | 0 | 0 | 1008 | 18 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 33 | **7072** |
| **20** | 92664 | 1898 | 0 | 43 | 13 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | **94643** |
| **21** | 65155 | 7183 | 0 | 1009 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | **73363** |
| **22** | 1 | 9 | 0 | 6275 | 6 | 192 | 18 | 0 | | 0 | 0 | 0 | 7 | **6508** |
| **23** | 0 | 0 | 0 | 127 | 2 | 58 | 14 | 0 | 1 | 0 | 112 | 0 | 2 | **316** |
| **24** | 1692 | 13104 | 0 | 481 | 9 | 497 | 28 | 0 | 52 | 0 | 0 | 0 | 69 | **15932** |
| **25** | 0 | 38467 | 0 | 46800 | 7 | 297 | 8 | 0 | 681 | 0 | 0 | 0 | 1430 | **87690** |
| **26** | 1509 | 32 | 0 | 7590 | 6 | 142 | 2 | 0 | 68 | 0 | 0 | 0 | 179 | **9528** |
| **27** | 0 | 0 | 0 | 20 | 7 | 0 | 14 | 0 | 0 | 0 | 0 | 0 | 6 | **47** |
| **28** | 0 | 37 | 0 | 66 | 0 | 1382 | 442 | 0 | 188 | 0 | 0 | 0 | 799 | **2914** |
| **29** | 6694 | 0 | 0 | 13 | 1 | 0 | 0 | 0 | 1 | 784 | 28 | 0 | 21 | **7542** |
| **30** | 170 | 0 | 0 | 316 | 2 | 13 | 2 | 0 | 1 | 0 | 996 | 0 | 19 | **1519** |
| **TOTAL** | **805650** | **211225** | **379** | **92506** | **390** | **3877** | **534** | **3015** | **1297** | **784** | **1136** | **67** | **4084** | **1124944** |

**Table 3.** *ECOCADIZ 2020-07* survey. Cont'd.

| Fishing haul | CATCH IN WEIGHT (kg) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ANE | PIL | SAA | MAS | MAC | HOM | JAA | HMM | BOG | BOC | SNS | MAV | OTHERS SPP | TOTAL |
| **01** | 212,345 | 0 | 0 | 35,035 | 3,260 | 89,525 | 0,034 | 0 | 0,044 | 0 | 0 | 0 | 26,759 | **367,002** |
| **02** | 7,410 | 0 | 0 | 891,425 | 0,740 | 0,098 | 0 | 4,050 | 0 | 0 | 0 | 0 | 0 | **903,723** |
| **03** | 0 | 0 | 65,475 | 8,235 | 0 | 0 | 0 | 192,420 | 0,495 | 0 | 0 | 0 | 41,845 | **308,470** |
| **04** | 17,461 | 582,176 | 0,284 | 187,766 | 1,060 | 0,654 | 0 | 250,149 | 29,550 | 0 | 0 | 0 | 48,911 | **1118,011** |
| **05** | 233,085 | 489,821 | 0 | 38,830 | 11,000 | 0,085 | 0 | 0 | 4,395 | 0 | 0 | 0 | 17,955 | **795,171** |
| **06** | 582,878 | 4,796 | 0 | 0,795 | 1,480 | 0,170 | 0 | 11,160 | 8,940 | 0 | 0 | 0 | 15,645 | **625,864** |
| **07** | 370,215 | 0 | 0 | 7,433 | 3,152 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8,235 | **389,035** |
| **08** | 492,806 | 98,233 | 0 | 11,155 | 4,045 | 0,376 | 0 | 0 | 0,635 | 0 | 0 | 0 | 18,595 | **625,845** |
| **09** | 844,715 | 0 | 0 | 78,400 | 6,115 | 0,210 | 0,09 | 0 | 0 | 0 | 0 | 0 | 8,890 | **938,420** |
| **12** | 0,990 | 0,032 | 5,115 | 194,235 | 0 | 0,025 | 0 | 124,060 | 16,480 | 0 | 0 | 0 | 25,050 | **365,987** |
| **13** | 903,590 | 0 | 0 | 5,485 | 0,520 | 0 | 0,03 | 1,000 | 0,260 | 0 | 0 | 0 | 9,330 | **920,215** |
| **14** | 569,937 | 599,568 | 0 | 432,275 | 7,605 | 0,050 | 0 | 0 | 0 | 0 | 0 | 0 | 7,090 | **1616,525** |
| **15** | 232,626 | 1080,325 | 0 | 50,800 | 1,180 | 0,030 | 0 | 0 | 0,545 | 0 | 0 | 0 | 5,160 | **1370,666** |
| **16** | 1125,821 | 0,320 | 0 | 10,455 | 1,855 | 1,980 | 0,04 | 0 | 0 | 0 | 0 | 0,081 | 5,760 | **1146,312** |
| **19** | 82,902 | 0 | 0 | 86,050 | 2,635 | 0,560 | 0 | 0 | 0 | 0 | 0 | 0 | 3,290 | **175,437** |
| **20** | 1245,826 | 46,027 | 0 | 2,375 | 1,185 | 0,190 | 0 | 0 | 0 | 0 | 0 | 0 | 2,050 | **1297,653** |
| **21** | 984,406 | 237,874 | 0 | 72,990 | 1,280 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,015 | **1297,565** |
| **22** | 0,024 | 0,545 | 0 | 599,080 | 1,620 | 14,110 | 1,05 | 0 | 2,130 | 0 | 0 | 0 | 1,110 | **619,669** |
| **23** | 0 | 0 | 0 | 14,150 | 0,415 | 9,770 | 1,815 | 0 | 0,170 | 0 | 1,3 | 0 | 0,225 | **27,845** |
| **24** | 40,180 | 555,210 | 0 | 32,305 | 1,020 | 40,440 | 1,54 | 0 | 7,310 | 0 | 0 | 0 | 9,905 | **687,910** |
| **25** | 0 | 1125,129 | 0 | 2828,557 | 3,210 | 20,885 | 0,546 | 0 | 76,190 | 0 | 0 | 0 | 197,010 | **4251,527** |
| **26** | 33,660 | 1,840 | 0 | 498,010 | 0,410 | 15,090 | 0,11 | 0 | 7,370 | 0 | 0 | 0 | 18,270 | **574,760** |
| **27** | 0 | 0 | 0 | 1,402 | 0,347 | 0 | 1,224 | 0 | 0 | 0 | 0 | 0 | 0,320 | **3,293** |
| **28** | 0 | 1,935 | 0 | 5,995 | 0 | 104,505 | 28,48 | 0 | 18,050 | 0 | 0 | 0 | 146,750 | **305,715** |
| **29** | 164,030 | 0 | 0 | 1,025 | 0,050 | 0 | 0 | 0 | 0,090 | 3,83 | 0,165 | 0 | 1,580 | **170,770** |
| **30** | 5,375 | 0 | 0 | 29,790 | 0,090 | 1,325 | 0,14 | 0 | 0,110 | 0 | 6,785 | 0 | 1,9950 | **45,610** |
| **TOTAL** | **8150,282** | **4823,831** | **70,874** | **6124,053** | **54,274** | **300,078** | **35,099** | **582,839** | **172,764** | **3,83** | **8,25** | **0,081** | **622,745** | **20949** |

**Table 4.** *ECOCADIZ 2020-07* survey. Parameters of the size-weight relationships for survey's target species. FAO codes for the species: ANE: *Engraulis encrasicolus*; PIL: *Sardina pilchardus*; SAA: *Sardinella aurita*; VAM: *Scomber colias*; MAC: *Scomber scombrus*; HOM: *Trachurus trachurus*; JAA: *Trachurus picturatus;* HMM: *Trachurus mediterraneus*; BOG: *Boops boops*; BOC: *Capros aper*; SNS: *Macrorhamphosus scolopax*; MAV: *Maurolicus muelleri* (*: parameters from the ECOCADIZ 2019-07 survey).

| PARAMETER | ANE | PIL | SAA | VAM | MAC | HOM | JAA | HMM | BOG |
|---|---|---|---|---|---|---|---|---|---|
| Size range (mm) | 72 - 186 | 108 - 216 | 223 - 349 | 163 - 388 | 164 - 403 | 78 - 337 | 145 - 281 | 168 - 412 | 164 - 331 |
| n | 1509 | 639 | 345 | 1199 | 387 | 416 | 133 | 203 | 367 |
| a | 0.002151 | 0.004150 | 0.026995 | 0.003621 | 0.001368 | 0.009470 | 0.004957 | 0.018000 | 0.008441 |
| b | 3.414748 | 3.238180 | 2.621522 | 3.243804 | 3.512345 | 2.940128 | 3.150865 | 2.733727 | 3.022297 |
| $r^2$ | 0.98 | 0.98 | 0.89 | 0.98 | 0.99 | 0.99 | 0.96 | 0.96 | 0.97 |

| PARAMETER | BOC | SNS | MAV(*) |
|---|---|---|---|
| Size range (mm) | 47 - 93 | 83 - 145 | 36 - 64 |
| n | 170 | 284 | 98 |
| a | 0.026171 | 0.003501 | 0,010578 |
| b | 2.849139 | 3.134380 | 2,869503 |
| $r^2$ | 0.90 | 0.89 | 0,96 |

**Table 5.** *ECOCADIZ 2020-07* survey. Anchovy (*E. encrasicolus*). Estimated abundance (absolute numbers and million fish) and biomass (t) by size class (in cm). Polygons (*i.e.*, coherent or homogeneous post-strata) numbered as in **Figure 18**.

| *ECOCADIZ 2020-07 . Engraulis encrasicolus* . ABUNDANCE (in numbers and million fish) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Size class** | **POL01** | **POL02** | **POL03** | **POL04** | **POL05** | **POL06** | **POL07** | **POL08** | **POL09** | **POL10** | **POL11** | **POL12** | **POL13** | ***n*** | | | **Millions** | | |
| | | | | | | | | | | | | | | **PORTUGAL** | **SPAIN** | **TOTAL** | **PORTUGAL** | **SPAIN** | **TOTAL** |
| **6** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **6,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **7** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25826006 | 0 | 0 | 0 | 0 | 0 | 0 | 25826006 | 25826006 | 0 | 26 | 26 |
| **7,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 189088838 | 0 | 0 | 0 | 0 | 0 | 0 | 189088838 | 189088838 | 0 | 189 | 189 |
| **8** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 260328587 | 0 | 0 | 0 | 0 | 0 | 0 | 260328587 | 260328587 | 0 | 260 | 260 |
| **8,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 269849042 | 0 | 406033 | 0 | 0 | 0 | 0 | 270255075 | 270255075 | 0 | 270 | 270 |
| **9** | 0 | 250390 | 0 | 0 | 0 | 5799098 | 0 | 386101751 | 3635224 | 93714 | 0 | 0 | 0 | 250390 | 395629787 | 395880177 | 0 | 396 | 396 |
| **9,5** | 0 | 0 | 0 | 0 | 0 | 13353196 | 0 | 508716153 | 24720234 | 343495 | 0 | 0 | 0 | 0 | 547133078 | 547133078 | 0 | 547 | 547 |
| **10** | 0 | 0 | 0 | 0 | 0 | 31222831 | 0 | 279916324 | 39991011 | 62538 | 0 | 0 | 0 | 0 | 351192704 | 351192704 | 0 | 351 | 351 |
| **10,5** | 0 | 0 | 1492128 | 73025 | 2933 | 156660616 | 425654 | 184445807 | 35629450 | 93714 | 2028898 | 326100 | 0 | 1492128 | 379686197 | 381178325 | 1 | 380 | 381 |
| **11** | 0 | 0 | 5133118 | 251215 | 10089 | 371854836 | 1464308 | 158362785 | 34173235 | 1405342 | 6122290 | 975561 | 123 | 5133118 | 574619784 | 579752902 | 5 | 575 | 580 |
| **11,5** | 0 | 0 | 22240760 | 1088465 | 43712 | 503306766 | 6344548 | 45949260 | 19632337 | 1124385 | 15270129 | 1463341 | 492 | 22240760 | 594223435 | 616464195 | 22 | 594 | 616 |
| **12** | 0 | 0 | 55806852 | 2731192 | 109683 | 420770331 | 15919836 | 20658771 | 13088225 | 812066 | 18687221 | 3578882 | 369 | 55806852 | 496356576 | 552163428 | 56 | 496 | 552 |
| **12,5** | 0 | 1604645 | 46011327 | 2251798 | 90431 | 231154492 | 13125500 | 0 | 5091440 | 218605 | 8151188 | 6831664 | 492 | 47615972 | 266915610 | 314531582 | 48 | 267 | 315 |
| **13** | 0 | 4824009 | 58301953 | 2853302 | 114586 | 143429181 | 16631606 | 5167236 | 726336 | 31176 | 4413744 | 8618365 | 861 | 63125962 | 181986393 | 245112355 | 63 | 182 | 245 |
| **13,5** | 106717 | 7452805 | 45063177 | 2205395 | 88567 | 64706857 | 12855024 | 0 | 0 | 93714 | 1708546 | 5691683 | 1231 | 52622699 | 87351017 | 139973716 | 53 | 87 | 140 |
| **14** | 533585 | 15557635 | 36583615 | 1790405 | 71901 | 38733859 | 10436087 | 0 | 0 | 0 | 1032247 | 3414462 | 861 | 52674835 | 55479822 | 108154657 | 53 | 55 | 108 |
| **14,5** | 533585 | 27485074 | 13311048 | 651444 | 26161 | 19253664 | 3797199 | 0 | 0 | 0 | 0 | 1625021 | 615 | 41329707 | 25354104 | 66683811 | 41 | 25 | 67 |
| **15** | 1600755 | 30021103 | 8349283 | 408615 | 16410 | 2982649 | 2381772 | 0 | 0 | 0 | 0 | 161680 | 861 | 39971141 | 5951987 | 45923128 | 40 | 6 | 46 |
| **15,5** | 3308227 | 19938807 | 2240312 | 109641 | 4403 | 0 | 639086 | 0 | 0 | 0 | 0 | 975561 | 4061 | 25487346 | 1732752 | 27220098 | 25 | 2 | 27 |
| **16** | 4482114 | 10403140 | 389797 | 19077 | 766 | 0 | 111196 | 0 | 0 | 0 | 0 | 1301661 | 11814 | 15275051 | 1444514 | 16719565 | 15 | 1 | 17 |
| **16,5** | 4695548 | 4952300 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1951121 | 7384 | 9647848 | 1958505 | 11606353 | 10 | 2 | 12 |
| **17** | 1600755 | 2852104 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1301661 | 3938 | 4452859 | 1305599 | 5758458 | 4 | 1 | 6 |
| **17,5** | 960453 | 603955 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 615 | 1564408 | 615 | 1565023 | 2 | 0,001 | 2 |
| **18** | 320151 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 123 | 320151 | 123 | 320274 | 0,3 | 0,0001 | 0,3 |
| **18,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **19** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **19,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **20** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTAL *n*** | 18141890 | 125945967 | 294923370 | 14433574 | 579642 | 2003228376 | 84131816 | 2334410560 | 176687492 | 4684782 | 57414263 | 38216763 | 33840 | 439011227 | 4713821108 | 5152832335 | **439** | **4714** | **5153** |
| **Millions** | **18** | **126** | **295** | **14** | **1** | **2003** | **84** | **2334** | **177** | **5** | **57** | **38** | **0,03** | | | | | | |

**Table 5.** *ECOCADIZ 2020-07* survey. Anchovy (*E. encrasicolus*). Cont'd.

| *ECOCADIZ 2020-07 . Engraulis encrasicolus* . BIOMASS (t) | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Size class** | **POL01** | **POL02** | **POL03** | **POL04** | **POL05** | **POL06** | **POL07** | **POL08** | **POL09** | **POL10** | **POL11** | **POL12** | **POL13** | **PORTUGAL** | **SPAIN** | **TOTAL** |
| **6** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** | **0** | **0** |
| **6,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** | **0** | **0** |
| **7** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 48,152 | 0 | 0 | 0 | 0 | 0 | **0** | **48,152** | **48,152** |
| **7,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 442,719 | 0 | 0 | 0 | 0 | 0 | **0** | **442,719** | **442,719** |
| **8** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 754,575 | 0 | 0 | 0 | 0 | 0 | **0** | **754,575** | **754,575** |
| **8,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 956,230 | 0 | 1,439 | 0 | 0 | 0 | **0** | **957,669** | **957,669** |
| **9** | 0 | 1,073 | 0 | 0 | 0 | 24,843 | 0 | 1654,069 | 15,573 | 0,401 | 0 | 0 | 0 | **1,073** | **1694,886** | **1695,959** |
| **9,5** | 0 | 0 | 0 | 0 | 0 | 68,471 | 0 | 2608,545 | 126,758 | 1,761 | 0 | 0 | 0 | **0** | **2805,535** | **2805,535** |
| **10** | 0 | 0 | 0 | 0 | 0 | 189,916 | 0 | 1702,616 | 243,249 | 0,380 | 0 | 0 | 0 | **0** | **2136,161** | **2136,161** |
| **10,5** | 0 | 0 | 10,679 | 0,523 | 0,021 | 1121,195 | 3,046 | 1320,049 | 254,994 | 0,671 | 14,52 | 2,334 | 0 | **10,679** | **2717,353** | **2728,032** |
| **11** | 0 | 0 | 42,907 | 2,100 | 0,084 | 3108,248 | 12,240 | 1323,718 | 285,646 | 11,747 | 51,175 | 8,154 | 0,001 | **42,907** | **4803,113** | **4846,020** |
| **11,5** | 0 | 0 | 215,665 | 10,555 | 0,424 | 4880,493 | 61,522 | 445,563 | 190,372 | 10,903 | 148,072 | 14,190 | 0,005 | **215,665** | **5762,099** | **5977,764** |
| **12** | 0 | 0 | 623,906 | 30,534 | 1,226 | 4704,104 | 177,980 | 230,960 | 146,323 | 9,079 | 208,918 | 40,011 | 0,004 | **623,906** | **5549,139** | **6173,045** |
| **12,5** | 0 | 20,565 | 589,691 | 28,860 | 1,159 | 2962,527 | 168,219 | 0 | 65,253 | 2,802 | 104,467 | 87,556 | 0,006 | **610,256** | **3420,849** | **4031,105** |
| **13** | 0 | 70,504 | 852,096 | 41,702 | 1,675 | 2096,251 | 243,075 | 75,520 | 10,616 | 0,456 | 64,508 | 125,959 | 0,013 | **922,60** | **2659,775** | **3582,375** |
| **13,5** | 1,770 | 123,611 | 747,412 | 36,578 | 1,469 | 1073,219 | 213,212 | 0 | 0 | 1,554 | 28,338 | 94,401 | 0,020 | **872,793** | **1448,791** | **2321,584** |
| **14** | 9,998 | 291,509 | 685,48 | 33,547 | 1,347 | 725,770 | 195,545 | 0 | 0 | 0 | 19,342 | 63,978 | 0,016 | **986,987** | **1039,545** | **2026,532** |
| **14,5** | 11,247 | 579,360 | 280,585 | 13,732 | 0,551 | 405,849 | 80,041 | 0 | 0 | 0 | 0 | 34,254 | 0,013 | **871,192** | **534,440** | **1405,632** |
| **15** | 37,811 | 709,114 | 197,214 | 9,652 | 0,388 | 70,452 | 56,259 | 0 | 0 | 0 | 0 | 3,819 | 0,020 | **944,139** | **140,59** | **1084,729** |
| **15,5** | 87,242 | 525,814 | 59,080 | 2,891 | 0,116 | 0 | 16,854 | 0 | 0 | 0 | 0 | 25,727 | 0,107 | **672,136** | **45,695** | **717,831** |
| **16** | 131,511 | 305,242 | 11,437 | 0,560 | 0,022 | 0 | 3,263 | 0 | 0 | 0 | 0 | 38,193 | 0,347 | **448,190** | **42,385** | **490,575** |
| **16,5** | 152,795 | 161,15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 63,490 | 0,240 | **313,945** | **63,730** | **377,675** |
| **17** | 57,593 | 102,615 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 46,832 | 0,142 | **160,208** | **46,974** | **207,182** |
| **17,5** | 38,097 | 23,956 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0,024 | **62,053** | **0,024** | **62,077** |
| **18** | 13,963 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0,005 | **13,963** | **0,005** | **13,968** |
| **18,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** | **0** | **0** |
| **19** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** | **0** | **0** |
| **19,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** | **0** | **0** |
| **20** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** | **0** | **0** |
| **TOTAL** | **542,027** | **2914,513** | **4316,152** | **211,234** | **8,482** | **21431,338** | **1231,256** | **11562,716** | **1338,784** | **41,193** | **639,340** | **648,898** | **0,963** | **7772,692** | **37114,204** | **44886,896** |

**Table 6.** *ECOCADIZ 2019-07* survey. Anchovy (*E. encrasicolus*). Estimated abundance (thousands of individuals) and biomass (tonnes) by age group (years). Polygons (*i.e.*, coherent or homogeneous post-strata) numbered as in **Figure 18** and ordered from west to east.

| Age class | POL 01 | POL 02 | POL 03 | POL 04 | POL 05 | POL 06 | POL 07 | POL 08 | POL 09 | POL 10 | POL 11 | POL 12 | POL 13 | PT | ES | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | N | N | N | N | N | N | N | N | N | N | N | N | N | N | N |
| 0 | 200 | 6161 | 91427 | 4474 | 180 | 1217760 | 26081 | 2250386 | 150228 | 3480 | 32260 | 9821 | 1 | 97788 | 3694672 | 3792460 |
| I | 13293 | 104151 | 198535 | 9716 | 390 | 779871 | 56636 | 83993 | 26455 | 1204 | 25092 | 26416 | 25 | 315979 | 1009799 | 1325778 |
| II | 4649 | 15634 | 4961 | 243 | 10 | 5597 | 1415 | 32 | 4 | 0,2 | 62 | 1980 | 7 | 25244 | 9351 | 34595 |
| III | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 18142 | 125946 | 294923 | 14434 | 580 | 2003228 | 84132 | 2334411 | 176687 | 4685 | 57414 | 38217 | 34 | 439011 | 4713821 | 5152832 |

| Age class | POL 01 | POL 02 | POL 03 | POL 04 | POL 05 | POL 06 | POL 07 | POL 08 | POL 09 | POL 10 | POL 11 | POL 12 | POL 13 | PT | ES | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 0 | 5 | 111 | 1113 | 54 | 2 | 11713 | 318 | 10834 | 1083 | 28 | 333 | 123 | 0,02 | 1229 | 24490 | 25718 |
| I | 385 | 2398 | 3099 | 152 | 6 | 9608 | 884 | 728 | 255 | 13 | 305 | 467 | 1 | 5882 | 12419 | 18302 |
| II | 152 | 406 | 104 | 5 | 0,2 | 110 | 30 | 0,5 | 0,1 | 0,003 | 1 | 59 | 0,2 | 662 | 205 | 867 |
| III | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 542 | 2915 | 4316 | 211 | 8 | 21431 | 1231 | 11563 | 1339 | 41 | 639 | 649 | 1 | 7773 | 37114 | 44887 |

**Table 7.** *ECOCADIZ 2020-07* survey. Sardine (*S. pilchardus*). Estimated abundance (absolute numbers and million fish) and biomass (t) by size class (in cm). Polygons (*i.e.*, coherent or homogeneous post-strata) numbered as in **Figure 21**.

| *ECOCADIZ 2020-07. Sardina pilchardus* . ABUNDANCE (in numbers and million fish) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Size class | POL01 | POL02 | POL03 | POL04 | POL05 | POL06 | POL07 | POL08 | *n* | | | Millions | | |
| | | | | | | | | | PORTUGAL | SPAIN | TOTAL | PORTUGAL | SPAIN | TOTAL |
| **6** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **6,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **7** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **7,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **8** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **8,5** | 0 | 56277 | 0 | 0 | 1983 | 861394 | 0 | 0 | 58260 | 861394 | 919654 | 0,1 | 1 | 1 |
| **9** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **9,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 0 | 0 | 0 | 0 | 0 | 2972384 | 0 | 0 | 2972384 | 2972384 | 0 | 3 | 3 |
| **10,5** | 0 | 0 | 0 | 0 | 0 | 0 | 25997500 | 0 | 0 | 25997500 | 25997500 | 0 | 26 | 26 |
| **11** | 0 | 47205 | 0 | 784338 | 1664 | 722534 | 49511572 | 3509973 | 833207 | 53744079 | 54577286 | 1 | 54 | 55 |
| **11,5** | 0 | 112554 | 0 | 784338 | 3967 | 1722788 | 41040571 | 5263513 | 900859 | 48026872 | 48927731 | 1 | 48 | 49 |
| **12** | 0 | 1218858 | 0 | 3137353 | 42955 | 18656221 | 20982522 | 20472434 | 4399166 | 60111177 | 64510343 | 4 | 60 | 65 |
| **12,5** | 0 | 4479513 | 0 | 9412060 | 157866 | 68564803 | 20750372 | 26320460 | 14049439 | 115635635 | 129685074 | 14 | 116 | 130 |
| **13** | 0 | 11811053 | 0 | 17998500 | 416241 | 180783616 | 10371664 | 28661407 | 30225794 | 219816687 | 250042481 | 30 | 220 | 250 |
| **13,5** | 0 | 13582593 | 0 | 17214162 | 478673 | 207899349 | 2398964 | 13452487 | 31275428 | 223750800 | 255026228 | 31 | 224 | 255 |
| **14** | 0 | 13978913 | 793166 | 32116589 | 492640 | 213965543 | 1023687 | 4679000 | 47381308 | 219668230 | 267049538 | 47 | 220 | 267 |
| **14,5** | 0 | 6375330 | 3993660 | 23488868 | 224677 | 97582762 | 1613 | 584513 | 34082535 | 98168888 | 132251423 | 34 | 98 | 132 |
| **15** | 0 | 3869368 | 4800741 | 13581437 | 136363 | 59225742 | 3226 | 584513 | 22387909 | 59813481 | 82201390 | 22 | 60 | 82 |
| **15,5** | 0 | 3435416 | 3993660 | 14200651 | 121070 | 52583539 | 281868 | 0 | 21750797 | 52865407 | 74616204 | 22 | 53 | 75 |
| **16** | 17864 | 3287435 | 9601483 | 23571430 | 115855 | 50318498 | 4840 | 0 | 36594067 | 50323338 | 86917405 | 37 | 50 | 87 |
| **16,5** | 17864 | 1939505 | 23196625 | 47762074 | 68351 | 29686655 | 8838 | 0 | 72984419 | 29695493 | 102679912 | 73 | 30 | 103 |
| **17** | 38519 | 2892676 | 62381807 | 53169881 | 101943 | 44276185 | 3226 | 0 | 118584826 | 44279411 | 162864237 | 119 | 44 | 163 |
| **17,5** | 160775 | 1882807 | 44793004 | 27121593 | 66353 | 28818825 | 32968 | 0 | 74024532 | 28851793 | 102876325 | 74 | 29 | 103 |
| **18** | 228323 | 1324772 | 21596378 | 11517389 | 46687 | 20277374 | 157838 | 0 | 34713549 | 20435212 | 55148761 | 35 | 20 | 55 |
| **18,5** | 254561 | 304981 | 6400988 | 0 | 10748 | 4668139 | 45805 | 0 | 6971278 | 4713944 | 11685222 | 7 | 5 | 12 |
| **19** | 192595 | 304981 | 0 | 0 | 10748 | 4668139 | 24970 | 0 | 508324 | 4693109 | 5201433 | 1 | 5 | 5 |
| **19,5** | 159659 | 182804 | 0 | 660495 | 6442 | 2798050 | 168290 | 0 | 1009400 | 2966340 | 3975740 | 1 | 3 | 4 |
| **20** | 121140 | 91633 | 793166 | 0 | 3229 | 1402567 | 176288 | 0 | 1009168 | 1578855 | 2588023 | 1 | 2 | 3 |
| **20,5** | 38519 | 0 | 0 | 0 | 0 | 0 | 3226 | 0 | 38519 | 3226 | 41745 | 0,04 | 0,003 | 0,04 |
| **21** | 74247 | 30544 | 0 | 0 | 1076 | 467522 | 0 | 0 | 105867 | 467522 | 573389 | 0,1 | 0,5 | 1 |
| **21,5** | 17864 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17864 | 0 | 17864 | 0,02 | 0 | 0,02 |
| **22** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **22,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **23** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTAL *n*** | 1321930 | 71209218 | 182344678 | 296521158 | 2509531 | 1089950245 | 175962232 | 103528300 | 553906515 | 1369440777 | 1923347292 | **554** | **1369** | **1923** |
| **Millions** | **1** | **71** | **182** | **297** | **3** | **1090** | **176** | **104** | **554** | **1369** | **1923** | | | |

**Table 7.** *ECOCADIZ 2020-07* survey. Sardine (*S. pilchardus*). Cont'd.

| *ECOCADIZ 2020-07* . *Sardina pilchardus* . BIOMASS (t) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Size class** | **POL01** | **POL02** | **POL03** | **POL04** | **POL05** | **POL06** | **POL07** | **POL08** | **PORTUGAL** | **SPAIN** | **TOTAL** |
| **6** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **6,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **7** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **7,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **8** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **8,5** | 0 | 0,262 | 0 | 0 | 0,009 | 4,014 | 0 | 0 | 0,271 | 4,014 | 4,285 |
| **9** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **9,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 0 | 0 | 0 | 0 | 0 | 23,121 | 0 | 0 | 23,121 | 23,121 |
| **10,5** | 0 | 0 | 0 | 0 | 0 | 0 | 235,951 | 0 | 0 | 235,951 | 235,951 |
| **11** | 0 | 0,496 | 0 | 8,248 | 0,017 | 7,598 | 520,633 | 36,909 | 8,761 | 565,14 | 573,901 |
| **11,5** | 0 | 1,363 | 0 | 9,495 | 0,048 | 20,855 | 496,813 | 63,717 | 10,906 | 581,385 | 592,291 |
| **12** | 0 | 16,886 | 0 | 43,466 | 0,595 | 258,469 | 290,698 | 283,631 | 60,947 | 832,798 | 893,745 |
| **12,5** | 0 | 70,644 | 0 | 148,433 | 2,490 | 1081,301 | 327,244 | 415,087 | 221,567 | 1823,632 | 2045,199 |
| **13** | 0 | 210,974 | 0 | 321,497 | 7,435 | 3229,24 | 185,263 | 511,963 | 539,906 | 3926,466 | 4466,372 |
| **13,5** | 0 | 273,537 | 0 | 346,672 | 9,640 | 4186,84 | 48,312 | 270,917 | 629,849 | 4506,069 | 5135,918 |
| **14** | 0 | 316,037 | 17,932 | 726,096 | 11,138 | 4837,359 | 23,144 | 105,783 | 1071,203 | 4966,286 | 6037,489 |
| **14,5** | 0 | 161,163 | 100,956 | 593,780 | 5,680 | 2466,813 | 0,041 | 14,776 | 861,579 | 2481,63 | 3343,209 |
| **15** | 0 | 108,964 | 135,193 | 382,464 | 3,840 | 1667,844 | 0,091 | 16,460 | 630,461 | 1684,395 | 2314,856 |
| **15,5** | 0 | 107,397 | 124,849 | 443,938 | 3,785 | 1643,857 | 8,812 | 0 | 679,969 | 1652,669 | 2332,638 |
| **16** | 0,618 | 113,716 | 332,127 | 815,364 | 4,008 | 1740,576 | 0,167 | 0 | 1265,833 | 1740,743 | 3006,576 |
| **16,5** | 0,682 | 74,007 | 885,135 | 1822,501 | 2,608 | 1132,781 | 0,337 | 0 | 2784,933 | 1133,118 | 3918,051 |
| **17** | 1,617 | 121,409 | 2618,231 | 2231,597 | 4,279 | 1858,319 | 0,135 | 0 | 4977,133 | 1858,454 | 6835,587 |
| **17,5** | 7,402 | 86,684 | 2062,261 | 1248,673 | 3,055 | 1326,813 | 1,518 | 0 | 3408,075 | 1328,331 | 4736,406 |
| **18** | 11,501 | 66,733 | 1087,881 | 580,169 | 2,352 | 1021,438 | 7,951 | 0 | 1748,636 | 1029,389 | 2778,025 |
| **18,5** | 13,996 | 16,768 | 351,932 | 0 | 0,591 | 256,658 | 2,518 | 0 | 383,287 | 259,176 | 642,463 |
| **19** | 11,531 | 18,260 | 0 | 0 | 0,644 | 279,490 | 1,495 | 0 | 30,435 | 280,985 | 311,420 |
| **19,5** | 10,387 | 11,892 | 0 | 42,969 | 0,419 | 182,028 | 10,948 | 0 | 65,667 | 192,976 | 258,643 |
| **20** | 8,545 | 6,464 | 55,951 | 0 | 0,228 | 98,939 | 12,436 | 0 | 71,188 | 111,375 | 182,563 |
| **20,5** | 2,940 | 0 | 0 | 0 | 0 | 0 | 0,246 | 0 | 2,940 | 0,246 | 3,186 |
| **21** | 6,122 | 2,519 | 0 | 0 | 0,089 | 38,551 | 0 | 0 | 8,730 | 38,551 | 47,281 |
| **21,5** | 1,588 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,588 | 0 | 1,588 |
| **22** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **22,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **23** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTAL** | **76,929** | **1786,175** | **7772,448** | **9765,362** | **62,950** | **27339,783** | **2197,874** | **1719,243** | **19463,864** | **31256,900** | **50720,764** |

**Table 8.** *ECOCADIZ 2019-07* survey. Sardine (*S. pilchardus*). Estimated abundance (thousands of individuals) and biomass (t) by age group (years). Polygons (*i.e.*, coherent or homogeneous post-strata) numbered as in **Figure 21** and ordered from west to east.

| Age class | POL 01 | POL 02 | POL 03 | POL 04 | POL 05 | POL 06 | POL 07 | POL 08 | PT | ES | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | N | N | N | N | N | N | N | N | N | N |
| 0 | 40 | 56218 | 28398 | 141923 | 1981 | 860495 | 175070 | 103169 | 228561 | 1138735 | 1367295 |
| I | 404 | 9847 | 79965 | 92939 | 347 | 150719 | 430 | 286 | 183502 | 151435 | 334937 |
| II | 623 | 4510 | 65222 | 55264 | 159 | 69024 | 369 | 73 | 125778 | 69466 | 195244 |
| III | 141 | 548 | 7787 | 5835 | 19 | 8395 | 38 | 0 | 14331 | 8433 | 22764 |
| IV | 73 | 74 | 933 | 559 | 3 | 1131 | 44 | 0 | 1643 | 1175 | 2817 |
| V | 40 | 12 | 40 | 0 | 0,4 | 187 | 10 | 0 | 92 | 197 | 289 |
| TOTAL | 1322 | 71209 | 182345 | 296521 | 2510 | 1089950 | 175962 | 103528 | 553907 | 1369441 | 1923347 |

| Age class | POL 01 | POL 02 | POL 03 | POL 04 | POL 05 | POL 06 | POL 07 | POL 08 | PT | ES | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | B | B | B | B | B | B | B | B | B | B |
| 0 | 2 | 1207 | 1034 | 3551 | 43 | 18473 | 2152 | 1711 | 5836 | 22337 | 28172 |
| I | 21 | 354 | 3424 | 3612 | 12 | 5417 | 17 | 7 | 7424 | 5440 | 12864 |
| II | 36 | 195 | 2914 | 2327 | 7 | 2982 | 22 | 2 | 5479 | 3006 | 8485 |
| III | 9 | 25 | 352 | 249 | 1 | 387 | 2 | 0 | 636 | 389 | 1025 |
| IV | 6 | 4 | 46 | 27 | 0,2 | 67 | 3 | 0 | 83 | 70 | 153 |
| V | 3 | 1 | 3 | 0 | 0,03 | 15 | 1 | 0 | 7 | 15 | 22 |
| TOTAL | 77 | 1786 | 7772 | 9765 | 63 | 27340 | 2198 | 1719 | 19464 | 31257 | 50721 |

**Table 9.** *ECOCADIZ 2020-07* survey. Round sardinella (*S. aurita*). Estimated abundance (absolute numbers and million fish) and biomass (t) by size class (in cm). Polygons (*i.e.*, coherent or homogeneous post-strata) numbered as in **Figure 24**.

| *ECOCADIZ 2020-07. Sardinella aurita* . ABUNDANCE (in numbers and million fish) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Size class | POL01 | POL02 | *n* | | | Millions | | |
| | | | PORTUGAL | SPAIN | TOTAL | PORTUGAL | SPAIN | TOTAL |
| **20** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **20,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **21** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **21,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **22** | 763 | 73337 | 0 | 74100 | 74100 | 0 | 0,1 | 0,1 |
| **22,5** | 763 | 73337 | 0 | 74100 | 74100 | 0 | 0,1 | 0,1 |
| **23** | 5344 | 513358 | 0 | 518702 | 518702 | 0 | 1 | 1 |
| **23,5** | 3054 | 293348 | 0 | 296402 | 296402 | 0 | 0,3 | 0,3 |
| **24** | 11452 | 1100053 | 0 | 1111505 | 1111505 | 0 | 1 | 1 |
| **24,5** | 9925 | 953380 | 0 | 963305 | 963305 | 0 | 1 | 1 |
| **25** | 13743 | 1320064 | 0 | 1333807 | 1333807 | 0 | 1 | 1 |
| **25,5** | 14506 | 1393401 | 0 | 1407907 | 1407907 | 0 | 1 | 1 |
| **26** | 8398 | 806706 | 0 | 815104 | 815104 | 0 | 1 | 1 |
| **26,5** | 7635 | 733369 | 0 | 741004 | 741004 | 0 | 1 | 1 |
| **27** | 4581 | 440021 | 0 | 444602 | 444602 | 0 | 0,4 | 0,4 |
| **27,5** | 5344 | 513358 | 0 | 518702 | 518702 | 0 | 1 | 1 |
| **28** | 9162 | 880043 | 0 | 889205 | 889205 | 0 | 1 | 1 |
| **28,5** | 9162 | 880043 | 0 | 889205 | 889205 | 0 | 1 | 1 |
| **29** | 29776 | 2860139 | 0 | 2889915 | 2889915 | 0 | 3 | 3 |
| **29,5** | 26722 | 2566791 | 0 | 2593513 | 2593513 | 0 | 3 | 3 |
| **30** | 35120 | 3373497 | 0 | 3408617 | 3408617 | 0 | 3 | 3 |
| **30,5** | 34357 | 3300160 | 0 | 3334517 | 3334517 | 0 | 3 | 3 |
| **31** | 16797 | 1613412 | 0 | 1630209 | 1630209 | 0 | 2 | 2 |
| **31,5** | 10689 | 1026716 | 0 | 1037405 | 1037405 | 0 | 1 | 1 |
| **32** | 7635 | 733369 | 0 | 741004 | 741004 | 0 | 1 | 1 |
| **32,5** | 3054 | 293348 | 0 | 296402 | 296402 | 0 | 0,3 | 0,3 |
| **33** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **33,5** | 1527 | 146674 | 0 | 148201 | 148201 | 0 | 0,1 | 0,1 |
| **34** | 763 | 73337 | 0 | 74100 | 74100 | 0 | 0,1 | 0,1 |
| **34,5** | 1527 | 146674 | 0 | 148201 | 148201 | 0 | 0,1 | 0,1 |
| **35** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **35,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **36** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **36,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **37** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **37,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **38** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **38,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **39** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **39,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **40** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTAL *n*** | 271799 | 26107935 | 0 | 26379734 | 26379734 | **0** | **26** | **26** |
| **Millions** | **0,3** | **26** | **0** | **26** | **26** | | | |

**Table 9.** *ECOCADIZ 2020-07* survey. Round sardinella (*S. aurita*). Cont'd.

| *ECOCADIZ 2020-07. Sardinella aurita* . BIOMASS (t) | | | | | |
|---|---|---|---|---|---|
| **Size class** | **POL01** | **POL02** | **PORTUGAL** | **SPAIN** | **TOTAL** |
| **20** | 0 | 0 | 0 | 0 | 0 |
| **20,5** | 0 | 0 | 0 | 0 | 0 |
| **21** | 0 | 0 | 0 | 0 | 0 |
| **21,5** | 0 | 0 | 0 | 0 | 0 |
| **22** | 0,070 | 6,740 | 0 | 6,810 | 6,810 |
| **22,5** | 0,074 | 7,144 | 0 | 7,218 | 7,218 |
| **23** | 0,551 | 52,943 | 0 | 53,494 | 53,494 |
| **23,5** | 0,333 | 31,989 | 0 | 32,322 | 32,322 |
| **24** | 1,319 | 126,692 | 0 | 128,011 | 128,011 |
| **24,5** | 1,206 | 115,834 | 0 | 117,040 | 117,040 |
| **25** | 1,760 | 169,019 | 0 | 170,779 | 170,779 |
| **25,5** | 1,955 | 187,820 | 0 | 189,775 | 189,775 |
| **26** | 1,191 | 114,360 | 0 | 115,551 | 115,551 |
| **26,5** | 1,137 | 109,236 | 0 | 110,373 | 110,373 |
| **27** | 0,716 | 68,802 | 0 | 69,518 | 69,518 |
| **27,5** | 0,876 | 84,188 | 0 | 85,064 | 85,064 |
| **28** | 1,575 | 151,238 | 0 | 152,813 | 152,813 |
| **28,5** | 1,649 | 158,357 | 0 | 160,006 | 160,006 |
| **29** | 5,606 | 538,456 | 0 | 544,062 | 544,062 |
| **29,5** | 5,259 | 505,185 | 0 | 510,444 | 510,444 |
| **30** | 7,221 | 693,611 | 0 | 700,832 | 700,832 |
| **30,5** | 7,374 | 708,329 | 0 | 715,703 | 715,703 |
| **31** | 3,761 | 361,251 | 0 | 365,012 | 365,012 |
| **31,5** | 2,495 | 239,655 | 0 | 242,150 | 242,150 |
| **32** | 1,857 | 178,340 | 0 | 180,197 | 180,197 |
| **32,5** | 0,773 | 74,272 | 0 | 75,045 | 75,045 |
| **33** | 0 | 0 | 0 | 0 | 0 |
| **33,5** | 0,418 | 40,183 | 0 | 40,601 | 40,601 |
| **34** | 0,217 | 20,881 | 0 | 21,098 | 21,098 |
| **34,5** | 0,452 | 43,379 | 0 | 43,831 | 43,831 |
| **35** | 0 | 0 | 0 | 0 | 0 |
| **35,5** | 0 | 0 | 0 | 0 | 0 |
| **36** | 0 | 0 | 0 | 0 | 0 |
| **36,5** | 0 | 0 | 0 | 0 | 0 |
| **37** | 0 | 0 | 0 | 0 | 0 |
| **37,5** | 0 | 0 | 0 | 0 | 0 |
| **38** | 0 | 0 | 0 | 0 | 0 |
| **38,5** | 0 | 0 | 0 | 0 | 0 |
| **39** | 0 | 0 | 0 | 0 | 0 |
| **39,5** | 0 | 0 | 0 | 0 | 0 |
| **40** | 0 | 0 | 0 | 0 | 0 |
| **TOTAL** | **49,845** | **4787,904** | **0** | **4837,749** | **4837,749** |

**Table 10.** *ECOCADIZ 2020-07* survey. Mackerel (*S. scombrus*). Estimated abundance (absolute numbers and million fish) and biomass (t) by size class (in cm). Polygons (*i.e.*, coherent or homogeneous post-strata) numbered as in **Figure 26**.

| *ECOCADIZ 2020-07. Scomber scombrus* . ABUNDANCE (in numbers and million fish) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Size class | POL01 | POL02 | POL03 | POL04 | POL05 | POL06 | POL07 | POL08 | *n* | | | Millions | | |
| | | | | | | | | | PORTUGAL | SPAIN | TOTAL | PORTUGAL | SPAIN | TOTAL |
| **15** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **15,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **16** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2550 | 0 | 2550 | 2550 | 0 | 0,003 | 0,003 |
| **16,5** | 0 | 0 | 0 | 0 | 0 | 11462 | 0 | 7650 | 0 | 19112 | 19112 | 0 | 0,02 | 0,02 |
| **17** | 0 | 0 | 0 | 0 | 0 | 22924 | 0 | 5100 | 0 | 28024 | 28024 | 0 | 0,03 | 0,03 |
| **17,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 43348 | 0 | 43348 | 43348 | 0 | 0,04 | 0,04 |
| **18** | 2576 | 5151 | 43 | 1049 | 7112 | 57311 | 0 | 45898 | 7727 | 111413 | 119140 | 0,01 | 0,1 | 0,1 |
| **18,5** | 0 | 0 | 0 | 0 | 0 | 22924 | 0 | 25499 | 0 | 48423 | 48423 | 0 | 0,05 | 0,05 |
| **19** | 2576 | 5151 | 43 | 1049 | 7112 | 11462 | 0 | 22949 | 7727 | 42615 | 50342 | 0,01 | 0,04 | 0,1 |
| **19,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2550 | 0 | 2550 | 2550 | 0 | 0,003 | 0,003 |
| **20** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **20,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2550 | 0 | 2550 | 2550 | 0 | 0,003 | 0,003 |
| **21** | 0 | 0 | 0 | 0 | 0 | 11462 | 0 | 0 | 0 | 11462 | 11462 | 0 | 0,01 | 0,01 |
| **21,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **22** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **22,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **23** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **23,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **24** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **24,5** | 0 | 0 | 0 | 0 | 0 | 11462 | 0 | 0 | 0 | 11462 | 11462 | 0 | 0,01 | 0,01 |
| **25** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **25,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **26** | 0 | 0 | 0 | 0 | 0 | 11462 | 2786 | 2550 | 0 | 16798 | 16798 | 0 | 0,02 | 0,02 |
| **26,5** | 0 | 0 | 0 | 0 | 0 | 22924 | 2786 | 0 | 0 | 25710 | 25710 | 0 | 0,03 | 0,03 |
| **27** | 2576 | 5151 | 43 | 1049 | 7112 | 68773 | 0 | 2550 | 7727 | 79527 | 87254 | 0,01 | 0,1 | 0,1 |
| **27,5** | 7727 | 15453 | 130 | 3147 | 21335 | 45849 | 2786 | 2550 | 23180 | 75797 | 98977 | 0,02 | 0,1 | 0,1 |
| **28** | 10302 | 20604 | 174 | 4196 | 28446 | 34387 | 2786 | 0 | 30906 | 69989 | 100895 | 0,03 | 0,1 | 0,1 |
| **28,5** | 23180 | 46359 | 391 | 9441 | 64004 | 80235 | 19499 | 0 | 69539 | 173570 | 243109 | 0,1 | 0,2 | 0,2 |
| **29** | 23180 | 46359 | 391 | 9441 | 64004 | 57311 | 33426 | 0 | 69539 | 164573 | 234112 | 0,1 | 0,2 | 0,2 |
| **29,5** | 18029 | 36057 | 304 | 7343 | 49781 | 11462 | 25070 | 0 | 54086 | 93960 | 148046 | 0,1 | 0,1 | 0,1 |
| **30** | 7727 | 15453 | 130 | 3147 | 21335 | 34387 | 30641 | 2550 | 23180 | 92190 | 115370 | 0,02 | 0,1 | 0,1 |
| **30,5** | 5151 | 10302 | 87 | 2098 | 14223 | 0 | 11142 | 2550 | 15453 | 30100 | 45553 | 0,02 | 0,03 | 0,05 |
| **31** | 0 | 0 | 0 | 0 | 0 | 0 | 5571 | 0 | 0 | 5571 | 5571 | 0 | 0,01 | 0,01 |
| **31,5** | 0 | 0 | 0 | 0 | 0 | 0 | 5571 | 0 | 0 | 5571 | 5571 | 0 | 0,01 | 0,01 |
| **32** | 0 | 0 | 0 | 0 | 0 | 0 | 2786 | 0 | 0 | 2786 | 2786 | 0 | 0,003 | 0,003 |
| **32,5** | 2576 | 5151 | 43 | 1049 | 7112 | 0 | 0 | 0 | 7727 | 8204 | 15931 | 0,01 | 0,01 | 0,02 |
| **33** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **33,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **34** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **34,5** | 0 | 0 | 0 | 0 | 0 | 0 | 2786 | 0 | 0 | 2786 | 2786 | 0 | 0,003 | 0,003 |
| **35** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTAL *n*** | 105600 | 211191 | 1779 | 43009 | 291576 | 515797 | 147636 | 170844 | 316791 | 1170641 | 1487432 | **0,3** | **1** | **1** |
| **Millions** | **0,1** | **0,2** | **0,002** | **0,04** | **0,3** | **1** | **0,1** | **0,2** | **0,3** | **1** | **1** | | | |

**Table 10.** *ECOCADIZ 2020-07* survey. Mackerel (*S. scombrus*). Cont'd.

| *ECOCADIZ 2020-07. Scomber scombrus*. BIOMASS (t) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Size class** | **POL01** | **POL02** | **POL03** | **POL04** | **POL05** | **POL06** | **POL07** | **POL08** | **PORTUGAL** | **SPAIN** | **TOTAL** |
| **15** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **15,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **16** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0,062 | 0 | 0,062 | 0,062 |
| **16,5** | 0 | 0 | 0 | 0 | 0 | 0,312 | 0 | 0,208 | 0 | 0,520 | 0,520 |
| **17** | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,693 | 0 | 0,154 | 0 | 0,847 | 0,847 |
| **17,5** | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0 | 1,448 | 0 | 1,448 | 1,448 |
| **18** | 0,095 | 0,190 | 0,002 | 0,039 | 0,262 | 2,111 | 0 | 1,690 | 0,285 | 4,104 | 4,389 |
| **18,5** | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,928 | 0 | 1,033 | 0,000 | 1,961 | 1,961 |
| **19** | 0,114 | 0,229 | 0,002 | 0,047 | 0,316 | 0,509 | 0 | 1,019 | 0,343 | 1,893 | 2,236 |
| **19,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0,124 | 0 | 0,124 | 0,124 |
| **20** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **20,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0,147 | 0 | 0,147 | 0,147 |
| **21** | 0 | 0 | 0 | 0 | 0 | 0,720 | 0 | 0 | 0 | 0,720 | 0,720 |
| **21,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **22** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **22,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **23** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **23,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **24** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **24,5** | 0 | 0 | 0 | 0 | 0 | 1,231 | 0 | 0 | 0 | 1,231 | 1,231 |
| **25** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **25,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **26** | 0 | 0 | 0 | 0 | 0 | 1,513 | 0,368 | 0,337 | 0 | 2,218 | 2,218 |
| **26,5** | 0 | 0 | 0 | 0 | 0 | 3,234 | 0,393 | 0 | 0 | 3,627 | 3,627 |
| **27** | 0,388 | 0,776 | 0,006 | 0,158 | 1,071 | 10,354 | 0 | 0,384 | 1,164 | 11,973 | 13,137 |
| **27,5** | 1,240 | 2,480 | 0,021 | 0,505 | 3,424 | 7,358 | 0,447 | 0,409 | 3,720 | 12,164 | 15,884 |
| **28** | 1,760 | 3,521 | 0,030 | 0,717 | 4,861 | 5,876 | 0,476 | 0 | 5,281 | 11,960 | 17,241 |
| **28,5** | 4,213 | 8,425 | 0,071 | 1,716 | 11,632 | 14,581 | 3,544 | 0 | 12,638 | 31,544 | 44,182 |
| **29** | 4,476 | 8,951 | 0,075 | 1,823 | 12,358 | 11,066 | 6,454 | 0 | 13,427 | 31,776 | 45,203 |
| **29,5** | 3,695 | 7,389 | 0,062 | 1,505 | 10,201 | 2,349 | 5,137 | 0 | 11,084 | 19,254 | 30,338 |
| **30** | 1,679 | 3,358 | 0,028 | 0,684 | 4,636 | 7,472 | 6,658 | 0,554 | 5,037 | 20,032 | 25,069 |
| **30,5** | 1,186 | 2,371 | 0,020 | 0,483 | 3,274 | 0 | 2,564 | 0,587 | 3,557 | 6,928 | 10,485 |
| **31** | 0 | 0 | 0 | 0 | 0 | 0 | 1,357 | 0 | 0 | 1,357 | 1,357 |
| **31,5** | 0 | 0 | 0 | 0 | 0 | 0 | 1,435 | 0 | 0 | 1,435 | 1,435 |
| **32** | 0 | 0 | 0 | 0 | 0 | 0 | 0,758 | 0 | 0 | 0,758 | 0,758 |
| **32,5** | 0,740 | 1,479 | 0,012 | 0,301 | 2,042 | 0 | 0 | 0 | 2,219 | 2,355 | 4,574 |
| **33** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **33,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **34** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **34,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0,985 | 0 | 0 | 0,985 | 0,985 |
| **35** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTAL** | **19,586** | **39,169** | **0,329** | **7,978** | **54,077** | **70,307** | **30,576** | **8,156** | **58,755** | **171,423** | **230,178** |

**Table 11.** *ECOCADIZ 2020-07* survey. Chub mackerel (*S. colias*). Estimated abundance (absolute numbers and million fish) and biomass (t) by size class (in cm). Polygons (*i.e.*, coherent or homogeneous post-strata) numbered as in **Figure 28**.

| *ECOCADIZ 2020-07* . *Scomber colias* . ABUNDANCE (in numbers and million fish) | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Size class | POL01 | POL02 | POL03 | POL04 | POL05 | POL06 | POL07 | POL08 | POL09 | POL10 | POL11 | POL12 | POL13 | POL14 | POL15 | POL16 | *n* | | | Millions | | |
| | | | | | | | | | | | | | | | | | PORTUGAL | SPAIN | TOTAL | PORTUGAL | SPAIN | TOTAL |
| **13** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **13,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **14** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **14,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **15** | 0 | 0 | 0 | 0 | 0 | 428 | 0 | 0 | 124055 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 428 | 124055 | 124483 | 0,0004 | 0,1 | 0,1 |
| **15,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **16** | 0 | 0 | 0 | 0 | 0 | 52 | 0 | 0 | 15033 | 0 | 0 | 0 | 0 | 0 | 0 | 11649 | 52 | 26682 | 26734 | 0,0001 | 0,03 | 0,03 |
| **16,5** | 0 | 0 | 0 | 0 | 0 | 685 | 0 | 0 | 198479 | 0 | 0 | 148759 | 4786 | 0 | 5261 | 11649 | 685 | 368934 | 369619 | 0,001 | 0,4 | 0,4 |
| **17** | 0 | 0 | 0 | 0 | 39116 | 4486 | 238 | 5037 | 1299820 | 77901 | 0 | 487382 | 46392 | 0 | 50998 | 210846 | 43602 | 2178614 | 2222216 | 0,04 | 2 | 2 |
| **17,5** | 0 | 95316 | 0 | 651000 | 219560 | 12320 | 1335 | 28272 | 3569576 | 437260 | 0 | 1484894 | 112310 | 594425 | 123461 | 703997 | 978196 | 7055530 | 8033726 | 1 | 7 | 8 |
| **18** | 0 | 1743636 | 0 | 11908856 | 233270 | 10617 | 1418 | 30037 | 3076136 | 464564 | 0 | 1129418 | 54224 | 743031 | 59608 | 830139 | 13896379 | 6388575 | 20284954 | 14 | 6 | 20 |
| **18,5** | 26807 | 5492780 | 191056 | 37515138 | 284271 | 6752 | 1728 | 36604 | 1956188 | 566133 | 0 | 1172895 | 45849 | 0 | 50401 | 472811 | 43516804 | 4302609 | 47819413 | 44 | 4 | 48 |
| **19** | 104387 | 6131310 | 743961 | 41876232 | 563994 | 4488 | 3429 | 72623 | 1300324 | 1123210 | 0 | 1091868 | 67250 | 222909 | 73927 | 497587 | 49424372 | 4453127 | 53877499 | 49 | 4 | 54 |
| **19,5** | 64175 | 5408247 | 457377 | 36937785 | 1013779 | 2816 | 6163 | 130540 | 816022 | 2018969 | 0 | 834592 | 105538 | 222909 | 116017 | 357934 | 43884179 | 4608684 | 48492863 | 44 | 5 | 48 |
| **20** | 387896 | 4285188 | 2764524 | 29267405 | 1236974 | 2655 | 7520 | 159280 | 769336 | 2463468 | 0 | 719539 | 114567 | 297212 | 125942 | 330201 | 37944642 | 4987065 | 42931707 | 38 | 5 | 43 |
| **20,5** | 377335 | 2536701 | 2689259 | 17325411 | 1545437 | 1185 | 9395 | 198999 | 343426 | 3077781 | 0 | 526118 | 115356 | 58447 | 126810 | 107663 | 24475328 | 4563995 | 29039323 | 24 | 5 | 29 |
| **21** | 706742 | 2955182 | 5036934 | 20183595 | 1627417 | 2235 | 9894 | 209555 | 647591 | 3241045 | 0 | 212933 | 117885 | 161974 | 129589 | 116310 | 30512105 | 4846776 | 35358881 | 31 | 5 | 35 |
| **21,5** | 931762 | 2076842 | 6640647 | 14184626 | 1793013 | 1467 | 10900 | 230878 | 425167 | 3570835 | 0 | 336253 | 114024 | 191198 | 125345 | 55287 | 25628357 | 5059887 | 30688244 | 26 | 5 | 31 |
| **22** | 1170186 | 2030946 | 8339888 | 13871159 | 2268651 | 2325 | 13792 | 292124 | 673755 | 4518081 | 0 | 372329 | 97680 | 775670 | 107379 | 104661 | 27683155 | 6955471 | 34638626 | 28 | 7 | 35 |
| **22,5** | 1571486 | 1018565 | 11199940 | 6956694 | 2311233 | 1776 | 14051 | 297607 | 514627 | 4602883 | 51563 | 354291 | 96212 | 1197410 | 105765 | 31990 | 23059694 | 7266399 | 30326093 | 23 | 7 | 30 |
| **23** | 1510154 | 406579 | 10762827 | 2776894 | 1705637 | 2673 | 10369 | 219627 | 774542 | 3396824 | 92814 | 445090 | 71247 | 1683332 | 78321 | 31990 | 17164764 | 6804156 | 23968920 | 17 | 7 | 24 |
| **23,5** | 642567 | 108728 | 4579557 | 742604 | 1132240 | 1317 | 6883 | 145793 | 381660 | 2254886 | 237192 | 171827 | 61268 | 1338383 | 67351 | 0 | 7207013 | 4665243 | 11872256 | 7 | 5 | 12 |
| **24** | 385865 | 47658 | 2750050 | 325500 | 644187 | 1198 | 3916 | 82949 | 347065 | 1282917 | 237192 | 166797 | 32687 | 823238 | 35933 | 0 | 4154458 | 3012694 | 7167152 | 4 | 3 | 7 |
| **24,5** | 248984 | 0 | 1774506 | 0 | 492473 | 993 | 2994 | 63414 | 287566 | 980774 | 185628 | 123319 | 26976 | 1016923 | 29655 | 0 | 2516956 | 2717249 | 5234205 | 3 | 3 | 5 |
| **25** | 120634 | 0 | 859752 | 0 | 326740 | 307 | 1986 | 42073 | 89087 | 650711 | 92814 | 0 | 17676 | 220421 | 19431 | 0 | 1307433 | 1134199 | 2441632 | 1 | 1 | 2 |
| **25,5** | 40211 | 0 | 286584 | 0 | 98278 | 307 | 597 | 12655 | 89087 | 195722 | 185628 | 23068 | 7043 | 533489 | 7743 | 0 | 425380 | 1055032 | 1480412 | 0,4 | 1 | 1 |
| **26** | 26807 | 0 | 191056 | 0 | 155499 | 0 | 945 | 20023 | 0 | 309680 | 51563 | 64175 | 2393 | 236277 | 2631 | 0 | 373362 | 687687 | 1061049 | 0,4 | 1 | 1 |
| **26,5** | 64175 | 0 | 457377 | 0 | 84756 | 0 | 515 | 10914 | 0 | 168795 | 288755 | 0 | 0 | 161974 | 0 | 0 | 606308 | 630953 | 1237261 | 1 | 1 | 1 |
| **27** | 26807 | 0 | 191056 | 0 | 107056 | 0 | 651 | 13785 | 0 | 213206 | 237192 | 0 | 0 | 177830 | 0 | 0 | 324919 | 642664 | 967583 | 0,3 | 1 | 1 |
| **27,5** | 64175 | 47658 | 457377 | 325500 | 0 | 0 | 0 | 0 | 0 | 0 | 185628 | 0 | 0 | 116895 | 0 | 0 | 894710 | 302523 | 1197233 | 1 | 0,3 | 1 |
| **28** | 0 | 0 | 0 | 0 | 56504 | 0 | 344 | 7276 | 0 | 112530 | 330006 | 0 | 0 | 148606 | 0 | 0 | 56504 | 598762 | 655266 | 0,1 | 1 | 1 |
| **28,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 237192 | 0 | 0 | 74303 | 0 | 0 | 0 | 311495 | 311495 | 0 | 0,3 | 0,3 |
| **29** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 804389 | 0 | 0 | 0 | 0 | 10170 | 0 | 814559 | 814559 | 0 | 1 | 1 |
| **29,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 618761 | 0 | 0 | 148606 | 0 | 0 | 0 | 767367 | 767367 | 0 | 1 | 1 |
| **30** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 474383 | 0 | 0 | 74303 | 0 | 0 | 0 | 548686 | 548686 | 0 | 1 | 0,5 |
| **30,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1051893 | 0 | 0 | 0 | 0 | 0 | 0 | 1051893 | 1051893 | 0 | 1 | 1 |
| **31** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 670324 | 0 | 0 | 0 | 0 | 0 | 0 | 670324 | 670324 | 0 | 1 | 1 |
| **31,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 433133 | 0 | 0 | 0 | 0 | 0 | 0 | 433133 | 433133 | 0 | 0,4 | 0,4 |
| **32** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 185628 | 0 | 0 | 0 | 0 | 0 | 0 | 185628 | 185628 | 0 | 0,2 | 0,2 |
| **32,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 567197 | 0 | 0 | 0 | 0 | 0 | 0 | 567197 | 567197 | 0 | 1 | 1 |
| **33** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 567197 | 0 | 0 | 0 | 0 | 0 | 0 | 567197 | 567197 | 0 | 1 | 1 |
| **33,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 185628 | 0 | 0 | 0 | 0 | 0 | 0 | 185628 | 185628 | 0 | 0,2 | 0,2 |
| **34** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 92814 | 0 | 0 | 0 | 0 | 0 | 0 | 92814 | 92814 | 0 | 0,1 | 0,1 |
| **34,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 144378 | 0 | 0 | 0 | 0 | 0 | 0 | 144378 | 144378 | 0 | 0,1 | 0,1 |
| **35** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 92814 | 0 | 0 | 148606 | 0 | 0 | 0 | 241420 | 241420 | 0 | 0,2 | 0,2 |
| **35,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 92814 | 0 | 0 | 74303 | 0 | 0 | 0 | 167117 | 167117 | 0 | 0,2 | 0,2 |
| **36** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **36,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **37** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTAL *n*** | 8471155 | 34385336 | 60373728 | 234848399 | 17940085 | 61082 | 109063 | 2310065 | 17698542 | 35728175 | 8394520 | 9865547 | 1311363 | 11442674 | 1441568 | 3884884 | 356079785 | 92186401 | 448266186 | **356** | **92** | **448** |
| **Millions** | **8** | **34** | **60** | **235** | **18** | **0,1** | **0,1** | **2** | **18** | **36** | **8** | **10** | **1** | **11** | **1** | **4** | | | | | | |

**Table 11.** *ECOCADIZ 2020-07* survey. Chub mackerel (*S. colias*). Cont'd.

| *ECOCADIZ 2019-07 . Scomber colias .* BIOMASS (t) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Size class** | **POL01** | **POL02** | **POL03** | **POL04** | **POL05** | **POL06** | **POL07** | **POL08** | **POL09** | **POL10** | **POL11** | **POL12** | **POL13** | **POL14** | **POL15** | **POL16** | **PORTUGAL** | **SPAIN** | **TOTAL** |
| **13** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **13,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **14** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **14,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **15** | 0 | 0 | 0 | 0 | 0 | 0,011 | 0 | 0 | 3,096 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0,011 | 3,096 | 3,107 |
| **15,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **16** | 0 | 0 | 0 | 0 | 0 | 0,002 | 0 | 0 | 0,461 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0,357 | 0,002 | 0,818 | 0,820 |
| **16,5** | 0 | 0 | 0 | 0 | 0 | 0,023 | 0 | 0 | 6,715 | 0 | 0 | 5,033 | 0,162 | 0 | 0,178 | 0,394 | 0,023 | 12,482 | 12,505 |
| **17** | 0 | 0 | 0 | 0 | 1,456 | 0,167 | 0,009 | 0,187 | 48,378 | 2,899 | 0 | 18,140 | 1,727 | 0 | 1,898 | 7,847 | 1,623 | 81,085 | 82,708 |
| **17,5** | 0 | 3,892 | 0 | 26,583 | 8,965 | 0,503 | 0,055 | 1,154 | 145,758 | 17,855 | 0 | 60,633 | 4,586 | 24,272 | 5,041 | 28,747 | 39,943 | 288,101 | 328,044 |
| **18** | 0 | 77,913 | 0 | 532,135 | 10,423 | 0,474 | 0,063 | 1,342 | 137,454 | 20,759 | 0 | 50,467 | 2,423 | 33,202 | 2,664 | 37,094 | 620,945 | 285,468 | 906,413 |
| **18,5** | 1,308 | 267,930 | 9,319 | 1829,935 | 13,866 | 0,329 | 0,084 | 1,785 | 95,420 | 27,615 | 0 | 57,212 | 2,236 | 0 | 2,458 | 23,063 | 2122,687 | 209,873 | 2332,56 |
| **19** | 5,546 | 325,730 | 39,523 | 2224,701 | 29,963 | 0,238 | 0,182 | 3,858 | 69,081 | 59,671 | 0 | 58,006 | 3,573 | 11,842 | 3,927 | 26,435 | 2625,701 | 236,575 | 2862,276 |
| **19,5** | 3,705 | 312,237 | 26,406 | 2132,549 | 58,529 | 0,163 | 0,356 | 7,537 | 47,112 | 116,562 | 0 | 48,184 | 6,093 | 12,869 | 6,698 | 20,665 | 2533,589 | 266,076 | 2799,665 |
| **20** | 24,286 | 268,299 | 173,089 | 1832,456 | 77,448 | 0,166 | 0,471 | 9,973 | 48,169 | 154,240 | 0 | 45,051 | 7,173 | 18,609 | 7,885 | 20,674 | 2375,744 | 312,245 | 2687,989 |
| **20,5** | 25,570 | 171,902 | 182,240 | 1174,072 | 104,728 | 0,080 | 0,637 | 13,485 | 23,273 | 208,569 | 0 | 35,653 | 7,817 | 3,961 | 8,593 | 7,296 | 1658,592 | 309,284 | 1967,876 |
| **21** | 51,739 | 216,341 | 368,741 | 1477,588 | 119,139 | 0,164 | 0,724 | 15,341 | 47,408 | 237,268 | 0 | 15,588 | 8,630 | 11,858 | 9,487 | 8,515 | 2233,712 | 354,819 | 2588,531 |
| **21,5** | 73,557 | 163,954 | 524,238 | 1119,789 | 141,547 | 0,116 | 0,860 | 18,226 | 33,564 | 281,895 | 0 | 26,545 | 9,001 | 15,094 | 9,895 | 4,365 | 2023,201 | 399,445 | 2422,646 |
| **22** | 99,447 | 172,598 | 708,757 | 1178,826 | 192,799 | 0,198 | 1,172 | 24,826 | 57,258 | 383,964 | 0 | 31,642 | 8,301 | 65,920 | 9,125 | 8,895 | 2352,625 | 591,103 | 2943,728 |
| **22,5** | 143,534 | 93,032 | 1022,963 | 635,400 | 211,100 | 0,162 | 1,283 | 27,182 | 47,004 | 420,411 | 4,710 | 32,360 | 8,788 | 109,367 | 9,660 | 2,922 | 2106,191 | 663,687 | 2769,878 |
| **23** | 148,010 | 39,849 | 1054,866 | 272,164 | 167,170 | 0,262 | 1,016 | 21,526 | 75,913 | 332,923 | 9,097 | 43,623 | 6,983 | 164,984 | 7,676 | 3,135 | 1682,321 | 666,876 | 2349,197 |
| **23,5** | 67,478 | 11,418 | 480,916 | 77,984 | 118,901 | 0,138 | 0,723 | 15,310 | 40,079 | 236,794 | 24,908 | 18,044 | 6,434 | 140,548 | 7,073 | 0 | 756,835 | 489,913 | 1246,748 |
| **24** | 43,354 | 5,355 | 308,984 | 36,572 | 72,378 | 0,135 | 0,440 | 9,320 | 38,995 | 144,143 | 26,650 | 18,741 | 3,673 | 92,496 | 4,037 | 0 | 466,778 | 338,495 | 805,273 |
| **24,5** | 29,890 | 0 | 213,022 | 0 | 59,119 | 0,119 | 0,359 | 7,613 | 34,521 | 117,738 | 22,284 | 14,804 | 3,238 | 122,077 | 3,560 | 0 | 302,150 | 326,194 | 628,344 |
| **25** | 15,452 | 0 | 110,128 | 0 | 41,853 | 0,039 | 0,254 | 5,389 | 11,411 | 83,351 | 11,889 | 0 | 2,264 | 28,234 | 2,489 | 0 | 167,472 | 145,281 | 312,753 |
| **25,5** | 5,489 | 0 | 39,120 | 0 | 13,415 | 0,042 | 0,081 | 1,727 | 12,161 | 26,717 | 25,339 | 3,149 | 0,961 | 72,824 | 1,057 | 0 | 58,066 | 144,016 | 202,082 |
| **26** | 3,895 | 0 | 27,759 | 0 | 22,593 | 0 | 0,137 | 2,909 | 0 | 44,994 | 7,492 | 9,324 | 0,348 | 34,329 | 0,382 | 0 | 54,247 | 99,915 | 154,162 |
| **26,5** | 9,913 | 0 | 70,647 | 0 | 13,092 | 0 | 0,080 | 1,686 | 0 | 26,072 | 44,602 | 0 | 0 | 25,019 | 0 | 0 | 93,652 | 97,459 | 191,111 |
| **27** | 4,397 | 0 | 31,338 | 0 | 17,560 | 0 | 0,107 | 2,261 | 0 | 34,971 | 38,905 | 0 | 0 | 29,169 | 0 | 0 | 53,295 | 105,413 | 158,708 |
| **27,5** | 11,166 | 8,292 | 79,579 | 56,634 | 0 | 0 | 0 | 0 | 0 | 0 | 32,297 | 0 | 0 | 20,339 | 0 | 0 | 155,671 | 52,636 | 208,307 |
| **28** | 0 | 0 | 0 | 0 | 10,417 | 0 | 0,063 | 1,341 | 0 | 20,747 | 60,842 | 0 | 0 | 27,398 | 0 | 0 | 10,417 | 110,391 | 120,808 |
| **28,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 46,291 | 0 | 0 | 14,501 | 0 | 0 | 0 | 60,792 | 60,792 |
| **29** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 166,017 | 0 | 0 | 0 | 0 | 2,099 | 0 | 168,116 | 168,116 |
| **29,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 134,924 | 0 | 0 | 32,404 | 0 | 0 | 0 | 167,328 | 167,328 |
| **30** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 109,188 | 0 | 0 | 17,102 | 0 | 0 | 0 | 126,290 | 126,29 |
| **30,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 255,336 | 0 | 0 | 0 | 0 | 0 | 0 | 255,336 | 255,336 |
| **31** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 171,454 | 0 | 0 | 0 | 0 | 0 | 0 | 171,454 | 171,454 |
| **31,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 116,640 | 0 | 0 | 0 | 0 | 0 | 0 | 116,640 | 116,64 |
| **32** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 52,587 | 0 | 0 | 0 | 0 | 0 | 0 | 52,587 | 52,587 |
| **32,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 168,906 | 0 | 0 | 0 | 0 | 0 | 0 | 168,906 | 168,906 |
| **33** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 177,415 | 0 | 0 | 0 | 0 | 0 | 0 | 177,415 | 177,415 |
| **33,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 60,943 | 0 | 0 | 0 | 0 | 0 | 0 | 60,943 | 60,943 |
| **34** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 31,961 | 0 | 0 | 0 | 0 | 0 | 0 | 31,961 | 31,961 |
| **34,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 52,110 | 0 | 0 | 0 | 0 | 0 | 0 | 52,110 | 52,11 |
| **35** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 35,088 | 0 | 0 | 56,180 | 0 | 0 | 0 | 91,268 | 91,268 |
| **35,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 36,728 | 0 | 0 | 29,403 | 0 | 0 | 0 | 66,131 | 66,131 |
| **36** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **36,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **37** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTAL** | **767,736** | **2138,742** | **5471,635** | **14607,388** | **1506,461** | **3,531** | **9,156** | **193,978** | **1023,231** | **3000,158** | **1924,603** | **592,199** | **94,411** | **1214,001** | **103,783** | **202,503** | **24495,493** | **8358,023** | **32853,516** |

**Table 12.** *ECOCADIZ 2019-07* survey. Chub mackerel (*S. colias*). Estimated abundance (thousands of individuals) and biomass (t) by age group (years). Polygons (*i.e.*, coherent or homogeneous post-strata) numbered as in **Figure 28** and ordered from west to east.

| Age class | POL 01 | POL 02 | POL 03 | POL 04 | POL 05 | POL 06 | POL 07 | POL 08 | POL 09 | POL 10 | POL 11 | POL 12 | POL 13 | POL 14 | POL 15 | POL 16 | PT | ES | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | N | N | N | N | N | N | N | N | N | N | N | N | N | N | N | N | N | N |
| 0 | 872 | 21895 | 6216 | 149542 | 4274 | 43 | 26 | 550 | 12396 | 8511 | 0 | 6688 | 571 | 1952 | 628 | 3153 | 182841 | 34476 | 217317 |
| I | 5582 | 11644 | 39783 | 79524 | 10411 | 14 | 63 | 1341 | 4075 | 20734 | 581 | 2544 | 598 | 4957 | 657 | 681 | 146957 | 36230 | 183187 |
| II | 2017 | 847 | 14375 | 5783 | 3255 | 4 | 20 | 419 | 1227 | 6483 | 3018 | 634 | 143 | 4131 | 157 | 46 | 26281 | 16278 | 42559 |
| III | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4339 | 0 | 0 | 217 | 0 | 5 | 0 | 4560 | 4560 |
| IV | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 341 | 0 | 0 | 167 | 0 | 0 | 0 | 508 | 508 |
| V | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 116 | 0 | 0 | 19 | 0 | 0 | 0 | 135 | 135 |
| TOTAL | 8471 | 34385 | 60374 | 234848 | 17940 | 61 | 109 | 2310 | 17699 | 35728 | 8395 | 9866 | 1311 | 11443 | 1442 | 3885 | 356080 | 92186 | 448266 |

| Age class | POL 01 | POL 02 | POL 03 | POL 04 | POL 05 | POL 06 | POL 07 | POL 08 | POL 09 | POL 10 | POL 11 | POL 12 | POL 13 | POL 14 | POL 15 | POL 16 | PT | ES | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 0 | 58 | 1212 | 416 | 8279 | 258 | 2 | 2 | 33 | 572 | 514 | 0 | 328 | 30 | 97 | 33 | 152 | 10226 | 1762 | 11988 |
| I | 493 | 846 | 3515 | 5776 | 892 | 1 | 5 | 115 | 320 | 1777 | 70 | 197 | 49 | 483 | 54 | 45 | 11523 | 3113 | 14636 |
| II | 216 | 81 | 1540 | 553 | 356 | 0,5 | 2 | 46 | 131 | 709 | 572 | 68 | 15 | 510 | 17 | 5 | 2747 | 2075 | 4821 |
| III | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1124 | 0 | 0 | 54 | 0 | 1 | 0 | 1178 | 1178 |
| IV | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 119 | 0 | 0 | 64 | 0 | 0 | 0 | 183 | 183 |
| V | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 40 | 0 | 0 | 7 | 0 | 0 | 0 | 47 | 47 |
| TOTAL | 768 | 2139 | 5472 | 14607 | 1506 | 4 | 9 | 194 | 1023 | 3000 | 1925 | 592 | 94 | 1214 | 104 | 203 | 24495 | 8358 | 32854 |

**Table 13.** *ECOCADIZ 2020-07* survey. Blue Jack mackerel (*T. picturatus*). Estimated abundance (absolute numbers and million fish) and biomass (t) by size class (in cm). Polygons (*i.e.*, coherent or homogeneous post-strata) numbered as in **Figure 31**.

| *ECOCADIZ 2020-07. Trachurus picturatus*. ABUNDANCE (in numbers and million fish) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Size class | POL01 | POL02 | POL03 | *n* | | | Millions | | |
| | | | | PORTUGAL | SPAIN | TOTAL | PORTUGAL | SPAIN | TOTAL |
| **10** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **11** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **11,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **12** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **12,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **13** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **13,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **14** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **14,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **15** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **15,5** | 30516 | 31 | 9 | 30516 | 40 | 30556 | 0,03 | 0,00004 | 0,03 |
| **16** | 61033 | 62 | 18 | 61033 | 80 | 61113 | 0,1 | 0,0001 | 0,1 |
| **16,5** | 122065 | 123 | 36 | 122065 | 159 | 122224 | 0,1 | 0,0002 | 0,1 |
| **17** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **17,5** | 152581 | 154 | 45 | 152581 | 199 | 152780 | 0,2 | 0,0002 | 0,2 |
| **18** | 427228 | 431 | 127 | 427228 | 558 | 427786 | 0,4 | 0,001 | 0,4 |
| **18,5** | 1251168 | 1261 | 372 | 1251168 | 1633 | 1252801 | 1 | 0,002 | 1 |
| **19** | 2441303 | 2460 | 725 | 2441303 | 3185 | 2444488 | 2 | 0,003 | 2 |
| **19,5** | 3784020 | 3814 | 1124 | 3784020 | 4938 | 3788958 | 4 | 0,005 | 4 |
| **20** | 2197173 | 2214 | 653 | 2197173 | 2867 | 2200040 | 2 | 0,003 | 2 |
| **20,5** | 1373233 | 1384 | 408 | 1373233 | 1792 | 1375025 | 1 | 0,002 | 1 |
| **21** | 671358 | 677 | 199 | 671358 | 876 | 672234 | 1 | 0,001 | 1 |
| **21,5** | 427228 | 431 | 127 | 427228 | 558 | 427786 | 0 | 0,001 | 0,4 |
| **22** | 122065 | 123 | 36 | 122065 | 159 | 122224 | 0 | 0,0002 | 0,1 |
| **22,5** | 152581 | 154 | 45 | 152581 | 199 | 152780 | 0 | 0,0002 | 0,2 |
| **23** | 152581 | 154 | 45 | 152581 | 199 | 152780 | 0 | 0,0002 | 0,2 |
| **23,5** | 61033 | 62 | 18 | 61033 | 80 | 61113 | 0 | 0,0001 | 0,1 |
| **24** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **24,5** | 30516 | 31 | 9 | 30516 | 40 | 30556 | 0,03 | 0,00004 | 0,03 |
| **25** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **25,5** | 30516 | 31 | 9 | 30516 | 40 | 30556 | 0,03 | 0,00004 | 0,03 |
| **26** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **26,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **27** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **27,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **28** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **28,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **29** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **29,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **30** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTAL *n*** | 13488198 | 13597 | 4005 | 13488198 | 17602 | 13505800 | **13** | **0,02** | **14** |
| **Millions** | **13** | **0,01** | **0,004** | **13** | **0,02** | **14** | | | |

**Table 13.** *ECOCADIZ 2020-07* survey. Blue Jack mackerel (*T. picturatus*). Cont'd.

| *ECOCADIZ 2020-07. Trachurus picturatus* . BIOMASS (t) | | | | | | |
|---|---|---|---|---|---|---|
| **Size class** | **POL01** | **POL02** | **POL03** | **PORTUGAL** | **SPAIN** | **TOTAL** |
| **10** | 0 | 0 | 0 | 0 | 0 | 0 |
| **10,5** | 0 | 0 | 0 | 0 | 0 | 0 |
| **11** | 0 | 0 | 0 | 0 | 0 | 0 |
| **11,5** | 0 | 0 | 0 | 0 | 0 | 0 |
| **12** | 0 | 0 | 0 | 0 | 0 | 0 |
| **12,5** | 0 | 0 | 0 | 0 | 0 | 0 |
| **13** | 0 | 0 | 0 | 0 | 0 | 0 |
| **13,5** | 0 | 0 | 0 | 0 | 0 | 0 |
| **14** | 0 | 0 | 0 | 0 | 0 | 0 |
| **14,5** | 0 | 0 | 0 | 0 | 0 | 0 |
| **15** | 0 | 0 | 0 | 0 | 0 | 0 |
| **15,5** | 0,896 | 0,001 | 0 | 0,896 | 0,001 | 0,897 |
| **16** | 1,977 | 0,002 | 0,001 | 1,977 | 0,003 | 1,980 |
| **16,5** | 4,350 | 0,004 | 0,001 | 4,350 | 0,005 | 4,355 |
| **17** | 0 | 0 | 0 | 0 | 0 | 0 |
| **17,5** | 6,528 | 0,007 | 0,002 | 6,528 | 0,009 | 6,537 |
| **18** | 19,950 | 0,020 | 0,006 | 19,950 | 0,026 | 19,976 |
| **18,5** | 63,619 | 0,064 | 0,019 | 63,619 | 0,083 | 63,702 |
| **19** | 134,866 | 0,136 | 0,040 | 134,866 | 0,176 | 135,042 |
| **19,5** | 226,633 | 0,228 | 0,067 | 226,633 | 0,295 | 226,928 |
| **20** | 142,379 | 0,143 | 0,042 | 142,379 | 0,185 | 142,564 |
| **20,5** | 96,096 | 0,097 | 0,029 | 96,096 | 0,126 | 96,222 |
| **21** | 50,640 | 0,051 | 0,015 | 50,640 | 0,066 | 50,706 |
| **21,5** | 34,676 | 0,035 | 0,010 | 34,676 | 0,045 | 34,721 |
| **22** | 10,643 | 0,011 | 0,003 | 10,643 | 0,014 | 10,657 |
| **22,5** | 14,269 | 0,014 | 0,004 | 14,269 | 0,018 | 14,287 |
| **23** | 15,280 | 0,015 | 0,005 | 15,280 | 0,020 | 15,300 |
| **23,5** | 6,536 | 0,007 | 0,002 | 6,536 | 0,009 | 6,545 |
| **24** | 0 | 0 | 0 | 0 | 0 | 0 |
| **24,5** | 3,721 | 0,004 | 0,001 | 3,721 | 0,005 | 3,726 |
| **25** | 0 | 0 | 0 | 0 | 0 | 0 |
| **25,5** | 4,216 | 0,004 | 0,001 | 4,216 | 0,005 | 4,221 |
| **26** | 0 | 0 | 0 | 0 | 0 | 0 |
| **26,5** | 0 | 0 | 0 | 0 | 0 | 0 |
| **27** | 0 | 0 | 0 | 0 | 0 | 0 |
| **27,5** | 0 | 0 | 0 | 0 | 0 | 0 |
| **28** | 0 | 0 | 0 | 0 | 0 | 0 |
| **28,5** | 0 | 0 | 0 | 0 | 0 | 0 |
| **29** | 0 | 0 | 0 | 0 | 0 | 0 |
| **29,5** | 0 | 0 | 0 | 0 | 0 | 0 |
| **30** | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTAL** | **837,275** | **0,843** | **0,248** | **837,275** | **1,091** | **838,366** |

**Table 14.** *ECOCADIZ 2020-07* survey. Horse mackerel (*T. trachurus*). Estimated abundance (absolute numbers and million fish) and biomass (t) by size class (in cm). Polygons (*i.e.*, coherent or homogeneous post-strata) numbered as in **Figure 33**.

| *ECOCADIZ 2020-07. Trachurus trachurus* . ABUNDANCE (in numbers and million fish) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Size class | POL01 | POL02 | POL03 | POL04 | POL05 | POL06 | POL07 | POL08 | *n* | | | Millions | | |
| | | | | | | | | | PORTUGAL | SPAIN | TOTAL | PORTUGAL | SPAIN | TOTAL |
| **10** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **11** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **11,5** | 0 | 0 | 0 | 0 | 369 | 96 | 136 | 15463 | 369 | 15695 | 16064 | 0,0004 | 0,02 | 0,02 |
| **12** | 0 | 0 | 0 | 0 | 492 | 129 | 181 | 20618 | 492 | 20928 | 21420 | 0,0005 | 0,02 | 0,02 |
| **12,5** | 0 | 0 | 0 | 0 | 1784 | 466 | 657 | 74740 | 1784 | 75863 | 77647 | 0,002 | 0,1 | 0,1 |
| **13** | 0 | 0 | 0 | 0 | 2337 | 611 | 861 | 97935 | 2337 | 99407 | 101744 | 0,002 | 0,1 | 0,1 |
| **13,5** | 2258 | 0 | 57446 | 0 | 1538 | 402 | 567 | 64431 | 61242 | 65400 | 126642 | 0,061 | 0,1 | 0,1 |
| **14** | 0 | 0 | 0 | 0 | 677 | 177 | 249 | 28350 | 677 | 28776 | 29453 | 0,001 | 0,03 | 0,03 |
| **14,5** | 0 | 0 | 0 | 0 | 62 | 16 | 23 | 2577 | 62 | 2616 | 2678 | 0,0001 | 0,00 | 0,003 |
| **15** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **15,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **16** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **16,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **17** | 18387 | 0 | 467850 | 0 | 0 | 0 | 0 | 0 | 486237 | 0 | 486237 | 0,5 | 0 | 0,5 |
| **17,5** | 22526 | 0 | 573181 | 0 | 984 | 257 | 363 | 41236 | 596691 | 41856 | 638547 | 1 | 0,0419 | 1 |
| **18** | 80529 | 0 | 2049064 | 0 | 2583 | 675 | 952 | 108244 | 2132176 | 109871 | 2242047 | 2 | 0,110 | 2 |
| **18,5** | 35135 | 0 | 893995 | 0 | 5474 | 1431 | 2017 | 229373 | 934604 | 232821 | 1167425 | 1 | 0,233 | 1 |
| **19** | 82629 | 0 | 2102479 | 0 | 2583 | 675 | 952 | 108244 | 2187691 | 109871 | 2297562 | 2 | 0,110 | 2 |
| **19,5** | 132800 | 0 | 3379070 | 0 | 5166 | 1351 | 1904 | 216487 | 3517036 | 219742 | 3736778 | 4 | 0,220 | 4 |
| **20** | 262150 | 34779 | 6670371 | 0 | 3260 | 852 | 1201 | 136593 | 6970560 | 138646 | 7109206 | 7 | 0,139 | 7 |
| **20,5** | 343193 | 86948 | 8732504 | 0 | 9717 | 2540 | 3581 | 407202 | 9172362 | 413323 | 9585685 | 9 | 0,413 | 10 |
| **21** | 316129 | 191285 | 8043860 | 0 | 9041 | 2363 | 3332 | 378853 | 8560315 | 384548 | 8944863 | 9 | 0,385 | 9 |
| **21,5** | 191981 | 365180 | 4884950 | 0 | 8733 | 2283 | 3219 | 365967 | 5450844 | 371469 | 5822313 | 5 | 0,371 | 6 |
| **22** | 100575 | 226064 | 2559127 | 0 | 7749 | 2026 | 2856 | 324731 | 2893515 | 329613 | 3223128 | 3 | 0,3296 | 3 |
| **22,5** | 40530 | 191285 | 1031275 | 0 | 4551 | 1190 | 1677 | 190715 | 1267641 | 193582 | 1461223 | 1 | 0,1936 | 1 |
| **23** | 25332 | 260843 | 644567 | 0 | 2583 | 675 | 952 | 108244 | 933325 | 109871 | 1043196 | 1 | 0,1099 | 1 |
| **23,5** | 6198 | 121727 | 157696 | 0 | 1968 | 514 | 725 | 82471 | 287589 | 83710 | 371299 | 0,3 | 0,0837 | 0,4 |
| **24** | 10351 | 173895 | 263369 | 96097 | 1599 | 418 | 589 | 67008 | 545311 | 68015 | 613326 | 1 | 0,1 | 1 |
| **24,5** | 2196 | 382570 | 55866 | 0 | 677 | 177 | 249 | 28350 | 441309 | 28776 | 470085 | 0,4 | 0,03 | 0,5 |
| **25** | 2258 | 173895 | 57446 | 0 | 1292 | 338 | 476 | 54122 | 234891 | 54936 | 289827 | 0,2 | 0,1 | 0,3 |
| **25,5** | 3940 | 139116 | 100251 | 96097 | 0 | 0 | 0 | 0 | 339404 | 0 | 339404 | 0,3 | 0 | 0,3 |
| **26** | 8301 | 86948 | 211212 | 211413 | 308 | 80 | 113 | 12886 | 518182 | 13079 | 531261 | 1 | 0,01 | 1 |
| **26,5** | 19525 | 17390 | 496823 | 0 | 0 | 0 | 0 | 0 | 533738 | 0 | 533738 | 1 | 0 | 1 |
| **27** | 4812 | 17390 | 122443 | 307510 | 0 | 0 | 0 | 0 | 452155 | 0 | 452155 | 0,5 | 0 | 0,5 |
| **27,5** | 4361 | 0 | 110961 | 307510 | 0 | 0 | 0 | 0 | 422832 | 0 | 422832 | 0,4 | 0 | 0,4 |
| **28** | 2617 | 0 | 66577 | 0 | 0 | 0 | 0 | 0 | 69194 | 0 | 69194 | 0,1 | 0 | 0,1 |
| **28,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **29** | 1744 | 0 | 44385 | 96097 | 0 | 0 | 0 | 0 | 142226 | 0 | 142226 | 0,1 | 0 | 0,1 |
| **29,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **30** | 1744 | 0 | 44385 | 0 | 0 | 0 | 0 | 0 | 46129 | 0 | 46129 | 0,05 | 0 | 0,05 |
| **30,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **31** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **31,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **32** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **32,5** | 11676 | 0 | 297093 | 0 | 0 | 0 | 0 | 0 | 308769 | 0 | 308769 | 0,3 | 0 | 0,3 |
| **33** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **33,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **34** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **34,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **35** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTAL *n*** | 1733877 | 2469315 | 44118246 | 1114724 | 75527 | 19742 | 27832 | 3164840 | 49511689 | 3212414 | 52724103 | **50** | **3** | **53** |
| **Millions** | **2** | **2** | **44** | **1** | **0,1** | **0,02** | **0,03** | **3** | **50** | **3** | **53** | | | |

**Table 14.** *ECOCADIZ 2020-07* survey. Horse mackerel (*T. trachurus*). Cont'd.

| *ECOCADIZ 2020-07. Trachurus trachurus*. BIOMASS (t) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Size class** | **POL01** | **POL02** | **POL03** | **POL04** | **POL05** | **POL06** | **POL07** | **POL08** | **PORTUGAL** | **SPAIN** | **TOTAL** |
| **10** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **11** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **11,5** | 0 | 0 | 0 | 0 | 0,005 | 0,001 | 0,002 | 0,205 | 0,005 | 0,208 | 0,213 |
| **12** | 0 | 0 | 0 | 0 | 0,007 | 0,002 | 0,003 | 0,309 | 0,007 | 0,314 | 0,321 |
| **12,5** | 0 | 0 | 0 | 0 | 0,030 | 0,008 | 0,011 | 1,260 | 0,030 | 1,279 | 1,309 |
| **13** | 0 | 0 | 0 | 0 | 0,044 | 0,012 | 0,016 | 1,848 | 0,044 | 1,876 | 1,920 |
| **13,5** | 0,048 | 0 | 1,209 | 0 | 0,032 | 0,008 | 0,012 | 1,356 | 1,289 | 1,376 | 2,665 |
| **14** | 0 | 0 | 0 | 0 | 0,016 | 0,004 | 0,006 | 0,663 | 0,016 | 0,673 | 0,689 |
| **14,5** | 0 | 0 | 0 | 0 | 0,002 | 0,000 | 0,001 | 0,067 | 0,002 | 0,068 | 0,070 |
| **15** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **15,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **16** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **16,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **17** | 0,754 | 0 | 19,176 | 0 | 0 | 0 | 0 | 0 | 19,930 | 0 | 19,930 |
| **17,5** | 1,004 | 0 | 25,552 | 0 | 0,044 | 0,011 | 0,016 | 1,838 | 26,600 | 1,865 | 28,465 |
| **18** | 3,895 | 0 | 99,121 | 0 | 0,125 | 0,033 | 0,046 | 5,236 | 103,141 | 5,315 | 108,456 |
| **18,5** | 1,840 | 0 | 46,823 | 0 | 0,287 | 0,075 | 0,106 | 12,013 | 48,950 | 12,194 | 61,144 |
| **19** | 4,676 | 0 | 118,975 | 0 | 0,146 | 0,038 | 0,054 | 6,125 | 123,797 | 6,217 | 130,014 |
| **19,5** | 8,103 | 0 | 206,188 | 0 | 0,315 | 0,082 | 0,116 | 13,210 | 214,606 | 13,408 | 228,014 |
| **20** | 17,216 | 2,284 | 438,067 | 0 | 0,214 | 0,056 | 0,079 | 8,971 | 457,781 | 9,106 | 466,887 |
| **20,5** | 24,214 | 6,135 | 616,133 | 0 | 0,686 | 0,179 | 0,253 | 28,731 | 647,168 | 29,163 | 676,331 |
| **21** | 23,922 | 14,475 | 608,701 | 0 | 0,684 | 0,179 | 0,252 | 28,669 | 647,782 | 29,100 | 676,882 |
| **21,5** | 15,556 | 29,590 | 395,818 | 0 | 0,708 | 0,185 | 0,261 | 29,654 | 441,672 | 30,100 | 471,772 |
| **22** | 8,713 | 19,583 | 221,691 | 0 | 0,671 | 0,176 | 0,247 | 28,131 | 250,658 | 28,554 | 279,212 |
| **22,5** | 3,748 | 17,689 | 95,369 | 0 | 0,421 | 0,110 | 0,155 | 17,637 | 117,227 | 17,902 | 135,129 |
| **23** | 2,497 | 25,714 | 63,542 | 0 | 0,255 | 0,067 | 0,094 | 10,671 | 92,008 | 10,832 | 102,840 |
| **23,5** | 0,650 | 12,775 | 16,549 | 0 | 0,207 | 0,054 | 0,076 | 8,655 | 30,181 | 8,785 | 38,966 |
| **24** | 1,155 | 19,402 | 29,385 | 10,722 | 0,178 | 0,047 | 0,066 | 7,476 | 60,842 | 7,589 | 68,431 |
| **24,5** | 0,260 | 45,325 | 6,619 | 0 | 0,080 | 0,021 | 0,030 | 3,359 | 52,284 | 3,410 | 55,694 |
| **25** | 0,284 | 21,850 | 7,218 | 0 | 0,162 | 0,042 | 0,060 | 6,800 | 29,514 | 6,902 | 36,416 |
| **25,5** | 0,524 | 18,517 | 13,344 | 12,791 | 0 | 0 | 0 | 0 | 45,176 | 0 | 45,176 |
| **26** | 1,169 | 12,247 | 29,749 | 29,777 | 0,043 | 0,011 | 0,016 | 1,815 | 72,985 | 1,842 | 74,827 |
| **26,5** | 2,907 | 2,589 | 73,969 | 0 | 0 | 0 | 0 | 0 | 79,465 | 0 | 79,465 |
| **27** | 0,757 | 2,734 | 19,250 | 48,345 | 0 | 0 | 0 | 0 | 71,086 | 0 | 71,086 |
| **27,5** | 0,723 | 0 | 18,403 | 51,000 | 0 | 0 | 0 | 0 | 70,126 | 0 | 70,126 |
| **28** | 0,457 | 0 | 11,637 | 0 | 0 | 0 | 0 | 0 | 12,094 | 0 | 12,094 |
| **28,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **29** | 0,338 | 0 | 8,593 | 18,606 | 0 | 0 | 0 | 0 | 27,537 | 0 | 27,537 |
| **29,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **30** | 0,373 | 0 | 9,486 | 0 | 0 | 0 | 0 | 0 | 9,859 | 0 | 9,859 |
| **30,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **31** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **31,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **32** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **32,5** | 3,152 | 0 | 80,194 | 0 | 0 | 0 | 0 | 0 | 83,346 | 0 | 83,346 |
| **33** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **33,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **34** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **34,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **35** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTAL** | **128,935** | **250,909** | **3280,761** | **171,241** | **5,362** | **1,401** | **1,978** | **224,699** | **3837,208** | **228,078** | **4065,286** |

**Table 15.** *ECOCADIZ 2020-07* survey. Mediterranean horse mackerel (*T. mediterraneus*). Estimated abundance (absolute numbers and million fish) and biomass (t) by size class (in cm). Polygons (*i.e.*, coherent or homogeneous post-strata) numbered as in **Figure 35**.

| *ECOCADIZ 2020-07. Trachurus mediterraneus* . ABUNDANCE (in numbers and million fish) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Size class | POL01 | POL02 | POL03 | POL04 | *n* | | | Millions | | |
| | | | | | PORTUGAL | SPAIN | TOTAL | PORTUGAL | SPAIN | TOTAL |
| **15** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **15,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **16** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **16,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **17** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **17,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **18** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **18,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **19** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **19,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **20** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **20,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **21** | 26 | 7336 | 13683 | 74041 | 0 | 95086 | 95086 | 0 | 0,1 | 0,1 |
| **21,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **22** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **22,5** | 79 | 22008 | 41048 | 222122 | 0 | 285257 | 285257 | 0 | 0,3 | 0,3 |
| **23** | 134 | 37278 | 69528 | 376235 | 0 | 483175 | 483175 | 0 | 0,5 | 0,5 |
| **23,5** | 79 | 22008 | 41048 | 222122 | 0 | 285257 | 285257 | 0 | 0,3 | 0,3 |
| **24** | 204 | 56794 | 105927 | 573200 | 0 | 736125 | 736125 | 0 | 1 | 1 |
| **24,5** | 242 | 67248 | 125425 | 678705 | 0 | 871620 | 871620 | 0 | 1 | 1 |
| **25** | 112 | 31193 | 58178 | 314816 | 0 | 404299 | 404299 | 0 | 0,4 | 0,4 |
| **25,5** | 224 | 62357 | 116304 | 629350 | 0 | 808235 | 808235 | 0 | 1 | 1 |
| **26** | 173 | 48235 | 89964 | 486819 | 0 | 625191 | 625191 | 0 | 1 | 1 |
| **26,5** | 167 | 46462 | 86658 | 468929 | 0 | 602216 | 602216 | 0 | 1 | 1 |
| **27** | 232 | 64700 | 120674 | 652997 | 0 | 838603 | 838603 | 0 | 1 | 1 |
| **27,5** | 428 | 119029 | 222004 | 1201321 | 0 | 1542782 | 1542782 | 0 | 2 | 2 |
| **28** | 1413 | 393089 | 733158 | 3967302 | 0 | 5094962 | 5094962 | 0 | 5 | 5 |
| **28,5** | 2906 | 808738 | 1508396 | 8162305 | 0 | 10482345 | 10482345 | 0 | 10 | 10 |
| **29** | 5673 | 1578709 | 2944486 | 15933346 | 0 | 20462214 | 20462214 | 0 | 20 | 20 |
| **29,5** | 2719 | 756526 | 1411013 | 7635341 | 0 | 9805599 | 9805599 | 0 | 10 | 10 |
| **30** | 3618 | 1006912 | 1878014 | 10162403 | 0 | 13050947 | 13050947 | 0 | 13 | 13 |
| **30,5** | 1371 | 381483 | 711513 | 3850171 | 0 | 4944538 | 4944538 | 0 | 5 | 5 |
| **31** | 3129 | 870631 | 1623833 | 8786962 | 0 | 11284555 | 11284555 | 0 | 11 | 11 |
| **31,5** | 294 | 81818 | 152601 | 825764 | 0 | 1060477 | 1060477 | 0 | 1 | 1 |
| **32** | 167 | 46462 | 86658 | 468929 | 0 | 602216 | 602216 | 0 | 1 | 1 |
| **32,5** | 53 | 14672 | 27365 | 148081 | 0 | 190171 | 190171 | 0 | 0,2 | 0,2 |
| **33** | 134 | 37278 | 69528 | 376235 | 0 | 483175 | 483175 | 0 | 0 | 0 |
| **33,5** | 136 | 37876 | 70643 | 382267 | 0 | 490922 | 490922 | 0 | 0 | 0 |
| **34** | 29 | 7934 | 14797 | 80073 | 0 | 102833 | 102833 | 0 | 0 | 0 |
| **34,5** | 26 | 7336 | 13683 | 74041 | 0 | 95086 | 95086 | 0 | 0,1 | 0,1 |
| **35** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **35,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **36** | 29 | 7934 | 14797 | 80073 | 0 | 102833 | 102833 | 0 | 0,1 | 0,1 |
| **36,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **37** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **37,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **38** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **38,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **39** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **39,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **40** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTAL *n*** | 23797 | 6622046 | 12350926 | 66833950 | 0 | 85830719 | 85830719 | **0** | **86** | **86** |
| **Millions** | **0,02** | **7** | **12** | **67** | **0** | **86** | **86** | | | |

**Table 15.** *ECOCADIZ 2020-07* survey. Mediterranean horse mackerel (*T. mediterraneus*). Cont'd.

| *ECOCADIZ 2020-07 . Trachurus mediterraneus* . BIOMASS (t) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Size class** | **POL01** | **POL02** | **POL03** | **POL04** | **PORTUGAL** | **SPAIN** | **TOTAL** |
| **15** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **15,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **16** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **16,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **17** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **17,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **18** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **18,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **19** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **19,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **20** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **20,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **21** | 0,002 | 0,562 | 1,047 | 5,667 | 0 | 7,278 | 7,278 |
| **21,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **22** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **22,5** | 0,007 | 2,030 | 3,786 | 20,487 | 0 | 26,310 | 26,310 |
| **23** | 0,013 | 3,649 | 6,806 | 36,827 | 0 | 47,295 | 47,295 |
| **23,5** | 0,008 | 2,283 | 4,258 | 23,044 | 0 | 29,593 | 29,593 |
| **24** | 0,022 | 6,237 | 11,633 | 62,951 | 0 | 80,843 | 80,843 |
| **24,5** | 0,028 | 7,809 | 14,565 | 78,815 | 0 | 101,217 | 101,217 |
| **25** | 0,014 | 3,826 | 7,136 | 38,613 | 0 | 49,589 | 49,589 |
| **25,5** | 0,029 | 8,069 | 15,050 | 81,442 | 0 | 104,590 | 104,590 |
| **26** | 0,024 | 6,579 | 12,270 | 66,398 | 0 | 85,271 | 85,271 |
| **26,5** | 0,024 | 6,672 | 12,445 | 67,344 | 0 | 86,485 | 86,485 |
| **27** | 0,035 | 9,774 | 18,230 | 98,648 | 0 | 126,687 | 126,687 |
| **27,5** | 0,068 | 18,898 | 35,247 | 190,731 | 0 | 244,944 | 244,944 |
| **28** | 0,236 | 65,532 | 122,225 | 661,393 | 0 | 849,386 | 849,386 |
| **28,5** | 0,508 | 141,449 | 263,821 | 1427,599 | 0 | 1833,377 | 1833,377 |
| **29** | 1,040 | 289,445 | 539,850 | 2921,263 | 0 | 3751,598 | 3751,598 |
| **29,5** | 0,522 | 145,282 | 270,968 | 1466,275 | 0 | 1883,047 | 1883,047 |
| **30** | 0,727 | 202,379 | 377,462 | 2042,543 | 0 | 2623,111 | 2623,111 |
| **30,5** | 0,288 | 80,189 | 149,562 | 809,316 | 0 | 1039,355 | 1039,355 |
| **31** | 0,687 | 191,259 | 356,721 | 1930,307 | 0 | 2478,974 | 2478,974 |
| **31,5** | 0,067 | 18,771 | 35,010 | 189,448 | 0 | 243,296 | 243,296 |
| **32** | 0,040 | 11,125 | 20,749 | 112,277 | 0 | 144,191 | 144,191 |
| **32,5** | 0,013 | 3,664 | 6,834 | 36,978 | 0 | 47,489 | 47,489 |
| **33** | 0,035 | 9,703 | 18,097 | 97,926 | 0 | 125,761 | 125,761 |
| **33,5** | 0,037 | 10,269 | 19,153 | 103,640 | 0 | 133,099 | 133,099 |
| **34** | 0,008 | 2,239 | 4,176 | 22,600 | 0 | 29,023 | 29,023 |
| **34,5** | 0,008 | 2,154 | 4,018 | 21,742 | 0 | 27,922 | 27,922 |
| **35** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **35,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **36** | 0,010 | 2,615 | 4,877 | 26,393 | 0 | 33,895 | 33,895 |
| **36,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **37** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **37,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **38** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **38,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **39** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **39,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **40** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTAL** | **4,490** | **1249,848** | **2331,119** | **12614,274** | **0** | **16199,731** | **16199,731** |

**Table 16.** *ECOCADIZ 2020-07* survey. Bogue (*B. boops*). Estimated abundance (absolute numbers and million fish) and biomass (t) by size class (in cm). Polygons (*i.e.*, coherent or homogeneous post-strata) numbered as in **Figure 37**.

| *ECOCADIZ 2020-07. Boops boops*. ABUNDANCE (in numbers and million fish) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Size class | POL01 | POL02 | POL03 | POL04 | POL05 | POL06 | POL07 | *n* | | | Millions | | |
| | | | | | | | | PORTUGAL | SPAIN | TOTAL | PORTUGAL | SPAIN | TOTAL |
| **10** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **11** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **11,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **12** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **12,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **13** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **13,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **14** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **14,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **15** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **15,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **16** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **16,5** | 25497 | 0 | 0 | 0 | 0 | 0 | 0 | 25497 | 0 | 25497 | 0,03 | 0 | 0,03 |
| **17** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **17,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **18** | 12749 | 0 | 0 | 0 | 0 | 0 | 0 | 12749 | 0 | 12749 | 0,01 | 0 | 0,01 |
| **18,5** | 38246 | 0 | 0 | 0 | 0 | 0 | 0 | 38246 | 0 | 38246 | 0,04 | 0 | 0,04 |
| **19** | 110825 | 0 | 0 | 0 | 0 | 0 | 5192 | 110825 | 5192 | 116017 | 0,1 | 0,01 | 0,1 |
| **19,5** | 127486 | 0 | 0 | 0 | 0 | 0 | 5192 | 127486 | 5192 | 132678 | 0,1 | 0,01 | 0,1 |
| **20** | 244147 | 0 | 0 | 0 | 0 | 15039 | 15575 | 244147 | 30614 | 274761 | 0,2 | 0,03 | 0,3 |
| **20,5** | 435375 | 0 | 0 | 0 | 0 | 0 | 20766 | 435375 | 20766 | 456141 | 0,4 | 0,02 | 0,5 |
| **21** | 661687 | 0 | 0 | 0 | 0 | 0 | 62299 | 661687 | 62299 | 723986 | 1 | 0,1 | 1 |
| **21,5** | 671435 | 0 | 0 | 0 | 0 | 0 | 67490 | 671435 | 67490 | 738925 | 1 | 0,1 | 1 |
| **22** | 1277822 | 185852 | 0 | 0 | 0 | 0 | 83065 | 1463674 | 83065 | 1546739 | 1 | 0,1 | 2 |
| **22,5** | 1010234 | 0 | 0 | 0 | 0 | 0 | 72682 | 1010234 | 72682 | 1082916 | 1 | 0,1 | 1 |
| **23** | 842840 | 0 | 0 | 0 | 0 | 0 | 93448 | 842840 | 93448 | 936288 | 1 | 0,1 | 1 |
| **23,5** | 564360 | 185852 | 0 | 0 | 0 | 0 | 88257 | 750212 | 88257 | 838469 | 0,8 | 0,1 | 1 |
| **24** | 492956 | 185852 | 0 | 0 | 0 | 15039 | 62299 | 678808 | 77338 | 756146 | 1 | 0,1 | 1 |
| **24,5** | 348972 | 0 | 0 | 0 | 0 | 0 | 15575 | 348972 | 15575 | 364547 | 0,3 | 0,02 | 0,4 |
| **25** | 167655 | 0 | 0 | 0 | 0 | 0 | 15575 | 167655 | 15575 | 183230 | 0,2 | 0,02 | 0,2 |
| **25,5** | 85327 | 0 | 0 | 0 | 0 | 0 | 5192 | 85327 | 5192 | 90519 | 0,1 | 0,01 | 0,1 |
| **26** | 59830 | 0 | 269 | 888 | 10615 | 0 | 15575 | 60099 | 27078 | 87177 | 0,1 | 0,03 | 0,1 |
| **26,5** | 12749 | 0 | 0 | 0 | 0 | 15039 | 10383 | 12749 | 25422 | 38171 | 0,01 | 0,03 | 0,04 |
| **27** | 0 | 185852 | 808 | 2664 | 31844 | 0 | 0 | 186660 | 34508 | 221168 | 0,2 | 0,03 | 0,2 |
| **27,5** | 0 | 0 | 1346 | 4441 | 53073 | 15039 | 10383 | 1346 | 82936 | 84282 | 0,001 | 0,1 | 0,1 |
| **28** | 0 | 0 | 1885 | 6217 | 74303 | 45116 | 15575 | 1885 | 141211 | 143096 | 0,002 | 0,1 | 0,1 |
| **28,5** | 0 | 0 | 5386 | 17763 | 212294 | 15039 | 25958 | 5386 | 271054 | 276440 | 0,01 | 0,3 | 0,3 |
| **29** | 0 | 0 | 2962 | 9770 | 116762 | 75193 | 20766 | 2962 | 222491 | 225453 | 0,003 | 0,2 | 0,2 |
| **29,5** | 0 | 0 | 2424 | 7993 | 95532 | 30077 | 10383 | 2424 | 143985 | 146409 | 0,002 | 0,1 | 0,1 |
| **30** | 0 | 0 | 2693 | 8882 | 106147 | 45116 | 25958 | 2693 | 186103 | 188796 | 0,003 | 0,2 | 0,2 |
| **30,5** | 0 | 0 | 808 | 2664 | 31844 | 75193 | 41533 | 808 | 151234 | 152042 | 0,001 | 0,2 | 0,2 |
| **31** | 0 | 0 | 0 | 0 | 0 | 60154 | 20766 | 0 | 80920 | 80920 | 0 | 0,1 | 0,1 |
| **31,5** | 0 | 0 | 0 | 0 | 0 | 30077 | 25958 | 0 | 56035 | 56035 | 0 | 0,1 | 0,1 |
| **32** | 0 | 0 | 269 | 888 | 10615 | 75193 | 41533 | 269 | 128229 | 128498 | 0,0003 | 0,1 | 0,1 |
| **32,5** | 0 | 0 | 0 | 0 | 0 | 0 | 5192 | 0 | 5192 | 5192 | 0 | 0,01 | 0,01 |
| **33** | 0 | 0 | 0 | 0 | 0 | 0 | 5192 | 0 | 5192 | 5192 | 0 | 0,01 | 0,01 |
| **33,5** | 0 | 0 | 0 | 0 | 0 | 0 | 5192 | 0 | 5192 | 5192 | 0 | 0,01 | 0,01 |
| **34** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **34,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **35** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTAL *n*** | 7190192 | 743408 | 18850 | 62170 | 743029 | 511314 | 892954 | 7952450 | 2209467 | 10161917 | **8** | **2** | **10** |
| **Millions** | **7** | **1** | **0,02** | **0,1** | **1** | **1** | **1** | **8** | **2** | **10** | | | |

**Table 16.** *ECOCADIZ 2020-07* survey. Bogue (*B. boops*). Cont'd.

| *ECOCADIZ 2020-07. Boops boops*. BIOMASS (t) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Size class** | **POL01** | **POL02** | **POL03** | **POL04** | **POL05** | **POL06** | **POL07** | **PORTUGAL** | **SPAIN** | **TOTAL** |
| **10** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **11** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **11,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **12** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **12,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **13** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **13,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **14** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **14,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **15** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **15,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **16** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **16,5** | 1,077 | 0 | 0 | 0 | 0 | 0 | 0 | 1,077 | 0 | 1,077 |
| **17** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **17,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **18** | 0,698 | 0 | 0 | 0 | 0 | 0 | 0 | 0,698 | 0 | 0,698 |
| **18,5** | 2,272 | 0 | 0 | 0 | 0 | 0 | 0 | 2,272 | 0 | 2,272 |
| **19** | 7,128 | 0 | 0 | 0 | 0 | 0 | 0,334 | 7,128 | 0,334 | 7,462 |
| **19,5** | 8,861 | 0 | 0 | 0 | 0 | 0 | 0,361 | 8,861 | 0,361 | 9,222 |
| **20** | 18,301 | 0 | 0 | 0 | 0 | 1,127 | 1,167 | 18,301 | 2,294 | 20,595 |
| **20,5** | 35,132 | 0 | 0 | 0 | 0 | 0 | 1,676 | 35,132 | 1,676 | 36,808 |
| **21** | 57,377 | 0 | 0 | 0 | 0 | 0 | 5,402 | 57,377 | 5,402 | 62,779 |
| **21,5** | 62,462 | 0 | 0 | 0 | 0 | 0 | 6,278 | 62,462 | 6,278 | 68,740 |
| **22** | 127,326 | 18,519 | 0 | 0 | 0 | 0 | 8,277 | 145,845 | 8,277 | 154,122 |
| **22,5** | 107,656 | 0 | 0 | 0 | 0 | 0 | 7,745 | 107,656 | 7,745 | 115,401 |
| **23** | 95,917 | 0 | 0 | 0 | 0 | 0 | 10,635 | 95,917 | 10,635 | 106,552 |
| **23,5** | 68,491 | 22,555 | 0 | 0 | 0 | 0 | 10,711 | 91,046 | 10,711 | 101,757 |
| **24** | 63,714 | 24,021 | 0 | 0 | 0 | 1,944 | 8,052 | 87,735 | 9,996 | 97,731 |
| **24,5** | 47,974 | 0 | 0 | 0 | 0 | 0 | 2,141 | 47,974 | 2,141 | 50,115 |
| **25** | 24,484 | 0 | 0 | 0 | 0 | 0 | 2,275 | 24,484 | 2,275 | 26,759 |
| **25,5** | 13,222 | 0 | 0 | 0 | 0 | 0 | 0,805 | 13,222 | 0,805 | 14,027 |
| **26** | 9,826 | 0 | 0,044 | 0,146 | 1,743 | 0 | 2,558 | 9,870 | 4,447 | 14,317 |
| **26,5** | 2,217 | 0 | 0 | 0 | 0 | 2,615 | 1,805 | 2,217 | 4,420 | 6,637 |
| **27** | 0 | 34,173 | 0,149 | 0,490 | 5,855 | 0,000 | 0,000 | 34,322 | 6,345 | 40,667 |
| **27,5** | 0 | 0 | 0,261 | 0,863 | 10,310 | 2,921 | 2,017 | 0,261 | 16,111 | 16,372 |
| **28** | 0 | 0 | 0,386 | 1,275 | 15,235 | 9,250 | 3,193 | 0,386 | 28,953 | 29,339 |
| **28,5** | 0 | 0 | 1,164 | 3,840 | 45,898 | 3,251 | 5,612 | 1,164 | 58,601 | 59,765 |
| **29** | 0 | 0 | 0,675 | 2,225 | 26,594 | 17,126 | 4,730 | 0,675 | 50,675 | 51,350 |
| **29,5** | 0 | 0 | 0,581 | 1,916 | 22,902 | 7,210 | 2,489 | 0,581 | 34,517 | 35,098 |
| **30** | 0 | 0 | 0,679 | 2,239 | 26,762 | 11,375 | 6,545 | 0,679 | 46,921 | 47,600 |
| **30,5** | 0 | 0 | 0,214 | 0,706 | 8,436 | 19,921 | 11,003 | 0,214 | 40,066 | 40,280 |
| **31** | 0 | 0 | 0 | 0 | 0 | 16,732 | 5,776 | 0 | 22,508 | 22,508 |
| **31,5** | 0 | 0 | 0 | 0 | 0 | 8,777 | 7,575 | 0 | 16,352 | 16,352 |
| **32** | 0 | 0 | 0,082 | 0,272 | 3,248 | 23,005 | 12,707 | 0,082 | 39,232 | 39,314 |
| **32,5** | 0 | 0 | 0 | 0 | 0 | 0 | 1,664 | 0 | 1,664 | 1,664 |
| **33** | 0 | 0 | 0 | 0 | 0 | 0 | 1,742 | 0 | 1,742 | 1,742 |
| **33,5** | 0 | 0 | 0 | 0 | 0 | 0 | 1,822 | 0 | 1,822 | 1,822 |
| **34** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **34,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **35** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTAL** | **754,135** | **99,268** | **4,235** | **13,972** | **166,983** | **125,254** | **137,097** | **857,638** | **443,306** | **1300,944** |

**Table 17.** *ECOCADIZ 2020-07* survey. Longspine snipefish (*M. scolopax*). Estimated abundance (absolute numbers and million fish) and biomass (t) by size class (in cm). Polygons (*i.e.*, coherent or homogeneous post-strata) numbered as in **Figure 39**.

| *ECOCADIZ 2020-07. Macroramphosus scolopax* . ABUNDANCE (in numbers and million fish) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Size class | POL01 | POL 02 | *n* | | | Millions | | |
| | | | PORTUGAL | SPAIN | TOTAL | PORTUGAL | SPAIN | TOTAL |
| **5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **5,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **6** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **6,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **7** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **7,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **8** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **8,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **9** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **9,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 4958516 | 0 | 4958516 | 0 | 4958516 | 5 | 0 | 5 |
| **10,5** | 16425085 | 0 | 16425085 | 0 | 16425085 | 16 | 0 | 16 |
| **11** | 34296404 | 39231 | 34335635 | 0 | 34335635 | 34 | 0 | 34 |
| **11,5** | 24999186 | 215770 | 25214956 | 0 | 25214956 | 25 | 0 | 25 |
| **12** | 19317553 | 274616 | 19592169 | 0 | 19592169 | 20 | 0 | 20 |
| **12,5** | 2892468 | 510001 | 3402469 | 0 | 3402469 | 3 | 0 | 3 |
| **13** | 0 | 490386 | 490386 | 0 | 490386 | 0,5 | 0 | 0,5 |
| **13,5** | 0 | 510001 | 510001 | 0 | 510001 | 1 | 0 | 1 |
| **14** | 0 | 137308 | 137308 | 0 | 137308 | 0,1 | 0 | 0,1 |
| **14,5** | 0 | 19615 | 19615 | 0 | 19615 | 0,02 | 0 | 0,02 |
| **15** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **15,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **16** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **16,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **17** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **17,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **18** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **18,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **19** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **19,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **20** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTAL *n*** | 102889212 | 2196928 | 105086140 | 0 | 105086140 | **105** | **0** | **105** |
| **Millions** | **103** | **2** | **105** | **0** | **105** | | | |

**Table 17.** *ECOCADIZ 2020-07* survey. Longspine snipefish (*M. scolopax*). Cont'd.

| *ECOCADIZ 2020-07. Macroramphosus scolopax* . BIOMASS (t) | | | | | |
|---|---|---|---|---|---|
| **Size class** | **POL01** | **POL02** | **PORTUGAL** | **SPAIN** | **TOTAL** |
| **5** | 0 | 0 | 0 | 0 | 0 |
| **5,5** | 0 | 0 | 0 | 0 | 0 |
| **6** | 0 | 0 | 0 | 0 | 0 |
| **6,5** | 0 | 0 | 0 | 0 | 0 |
| **7** | 0 | 0 | 0 | 0 | 0 |
| **7,5** | 0 | 0 | 0 | 0 | 0 |
| **8** | 0 | 0 | 0 | 0 | 0 |
| **8,5** | 0 | 0 | 0 | 0 | 0 |
| **9** | 0 | 0 | 0 | 0 | 0 |
| **9,5** | 0 | 0 | 0 | 0 | 0 |
| **10** | 25,562 | 0 | 25,562 | 0 | 25,562 |
| **10,5** | 98,306 | 0 | 98,306 | 0 | 98,306 |
| **11** | 236,704 | 0,271 | 236,975 | 0 | 236,975 |
| **11,5** | 197,732 | 1,707 | 199,439 | 0 | 199,439 |
| **12** | 174,112 | 2,475 | 176,587 | 0 | 176,587 |
| **12,5** | 29,553 | 5,211 | 34,764 | 0 | 34,764 |
| **13** | 0 | 5,652 | 5,652 | 0 | 5,652 |
| **13,5** | 0 | 6,602 | 6,602 | 0 | 6,602 |
| **14** | 0 | 1,988 | 1,988 | 0 | 1,988 |
| **14,5** | 0 | 0,316 | 0,316 | 0 | 0,316 |
| **15** | 0 | 0 | 0 | 0 | 0 |
| **15,5** | 0 | 0 | 0 | 0 | 0 |
| **16** | 0 | 0 | 0 | 0 | 0 |
| **16,5** | 0 | 0 | 0 | 0 | 0 |
| **17** | 0 | 0 | 0 | 0 | 0 |
| **17,5** | 0 | 0 | 0 | 0 | 0 |
| **18** | 0 | 0 | 0 | 0 | 0 |
| **18,5** | 0 | 0 | 0 | 0 | 0 |
| **19** | 0 | 0 | 0 | 0 | 0 |
| **19,5** | 0 | 0 | 0 | 0 | 0 |
| **20** | 0 | 0 | 0 | 0 | 0 |
| **TOTAL** | **761,969** | **24,222** | **786,191** | **0** | **786,191** |

**Table 18.** *ECOCADIZ 2020-07* survey. Boarfish (*C. aper*). Estimated abundance (absolute numbers and million fish) and biomass (t) by size class (in cm). Polygons (*i.e.*, coherent or homogeneous post-strata) numbered as in **Figure 41**.

| *ECOCADIZ 2020-07. Capros aper* . ABUNDANCE (in numbers and million fish) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Size class | POL01 | *n* | | | Millions | | |
| | | PORTUGAL | SPAIN | TOTAL | PORTUGAL | SPAIN | TOTAL |
| **2** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **2,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **3** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **3,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **4** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **4,5** | 48860 | 48860 | 0 | 48860 | 0,05 | 0 | 0,05 |
| **5** | 273618 | 273618 | 0 | 273618 | 0,3 | 0 | 0,3 |
| **5,5** | 2247579 | 2247579 | 0 | 2247579 | 2 | 0 | 2 |
| **6** | 2745955 | 2745955 | 0 | 2745955 | 3 | 0 | 3 |
| **6,5** | 1710114 | 1710114 | 0 | 1710114 | 2 | 0 | 2 |
| **7** | 449516 | 449516 | 0 | 449516 | 0,4 | 0 | 0,4 |
| **7,5** | 87949 | 87949 | 0 | 87949 | 0,1 | 0 | 0,1 |
| **8** | 48860 | 48860 | 0 | 48860 | 0,05 | 0 | 0,05 |
| **8,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **9** | 48860 | 48860 | 0 | 48860 | 0,05 | 0 | 0,05 |
| **9,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTAL *n*** | 7661311 | 7661311 | 0 | 7661311 | **8** | **0** | **8** |
| **Millions** | **8** | **8** | **0** | **8** | | | |

| *ECOCADIZ 2020-07. Trachurus trachurus* . BIOMASA (t) | | | | |
|---|---|---|---|---|
| Size class | POL01 | PORTUGAL | SPAIN | TOTAL |
| **2** | 0 | 0 | 0 | 0 |
| **2,5** | 0 | 0 | 0 | 0 |
| **3** | 0 | 0 | 0 | 0 |
| **3,5** | 0 | 0 | 0 | 0 |
| **4** | 0 | 0 | 0 | 0 |
| **4,5** | 0,108 | 0,108 | 0 | 0,108 |
| **5** | 0,807 | 0,807 | 0 | 0,807 |
| **5,5** | 8,589 | 8,589 | 0 | 8,589 |
| **6** | 13,307 | 13,307 | 0 | 13,307 |
| **6,5** | 10,319 | 10,319 | 0 | 10,319 |
| **7** | 3,325 | 3,325 | 0 | 3,325 |
| **7,5** | 0,787 | 0,787 | 0 | 0,787 |
| **8** | 0,522 | 0,522 | 0 | 0,522 |
| **8,5** | 0 | 0 | 0 | 0 |
| **9** | 0,724 | 0,724 | 0 | 0,724 |
| **9,5** | 0 | 0 | 0 | 0 |
| **10** | 0 | 0 | 0 | 0 |
| **TOTAL** | **38,488** | **38,488** | **0** | **38,488** |

**Table 19.** *ECOCADIZ 2020-07* survey. Pearlside (*M. muelleri*). Estimated abundance (absolute numbers and million fish) and biomass (t) by size class (in cm). Polygons (*i.e.*, coherent or homogeneous post-strata) numbered as in **Figure 43**.

| *ECOCADIZ 2020-07. Maurolicus muelleri*. ABUNDANCE (in numbers and million fish) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Size class | POL01 | POL02 | POL03 | POL04 | *n* | | | Millions | | |
| | | | | | PORTUGAL | SPAIN | TOTAL | PORTUGAL | SPAIN | TOTAL |
| **2** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **2,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **3** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **3,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **4** | 21160296 | 51051 | 133147164 | 9218244 | 21211347 | 142365408 | 163576755 | 21 | 142 | 164 |
| **4,5** | 21160296 | 51051 | 133147164 | 9218244 | 21211347 | 142365408 | 163576755 | 21 | 142 | 164 |
| **5** | 50255704 | 121246 | 316224514 | 21893329 | 50376950 | 338117843 | 388494793 | 50 | 338 | 388 |
| **5,5** | 76706075 | 185059 | 482658468 | 33416133 | 76891134 | 516074601 | 592965735 | 77 | 516 | 593 |
| **6** | 7935111 | 19144 | 49930186 | 3456841 | 7954255 | 53387027 | 61341282 | 8 | 53 | 61 |
| **6,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **7** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **7,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **8** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **8,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **9** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **9,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTAL *n*** | 177217482 | 427551 | 1115107496 | 77202791 | 177645033 | 1192310287 | 1369955320 | **178** | **1192** | **1370** |
| **Millions** | **177** | **0,4** | **1115** | **77** | **178** | **1192** | **1370** | | | |

| *ECOCADIZ 2020-07. Maurolicus muelleri*. BIOMASS (t) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Size class | POL01 | POL02 | POL03 | POL04 | PORTUGAL | SPAIN | TOTAL |
| **2** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **2,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **3** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **3,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **4** | 14,226 | 0,034 | 89,513 | 6,197 | 14,260 | 95,710 | 109,970 |
| **4,5** | 19,574 | 0,047 | 123,168 | 8,527 | 19,621 | 131,695 | 151,316 |
| **5** | 61,955 | 0,149 | 389,840 | 26,990 | 62,104 | 416,830 | 478,934 |
| **5,5** | 122,769 | 0,296 | 772,503 | 53,483 | 123,065 | 825,986 | 949,051 |
| **6** | 16,133 | 0,039 | 101,516 | 7,028 | 16,172 | 108,544 | 124,716 |
| **6,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **7** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **7,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **8** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **8,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **9** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **9,5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTAL** | **234,657** | **0,565** | **1476,540** | **102,225** | **235,222** | **1578,765** | **1813,987** |

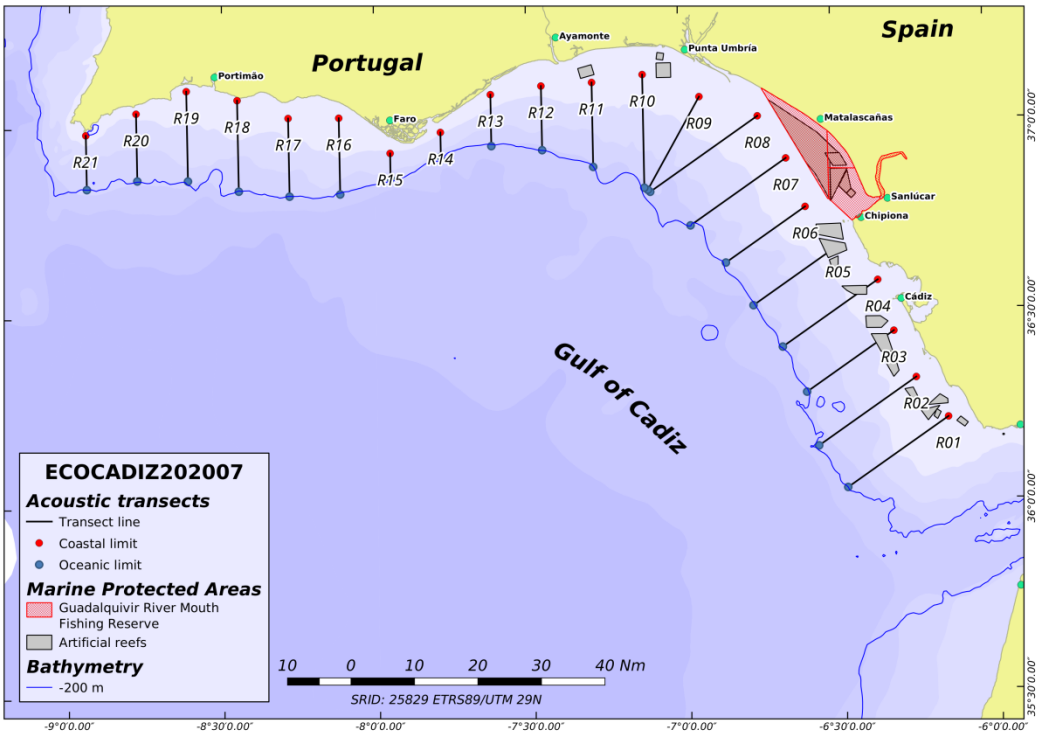



**Figure 1.** *ECOCADIZ 2020-07* survey. Location of the acoustic transects sampled during the survey. The different protected areas inside the Guadalquivir river mouth Fishing Reserve and artificial reef polygons are also shown.

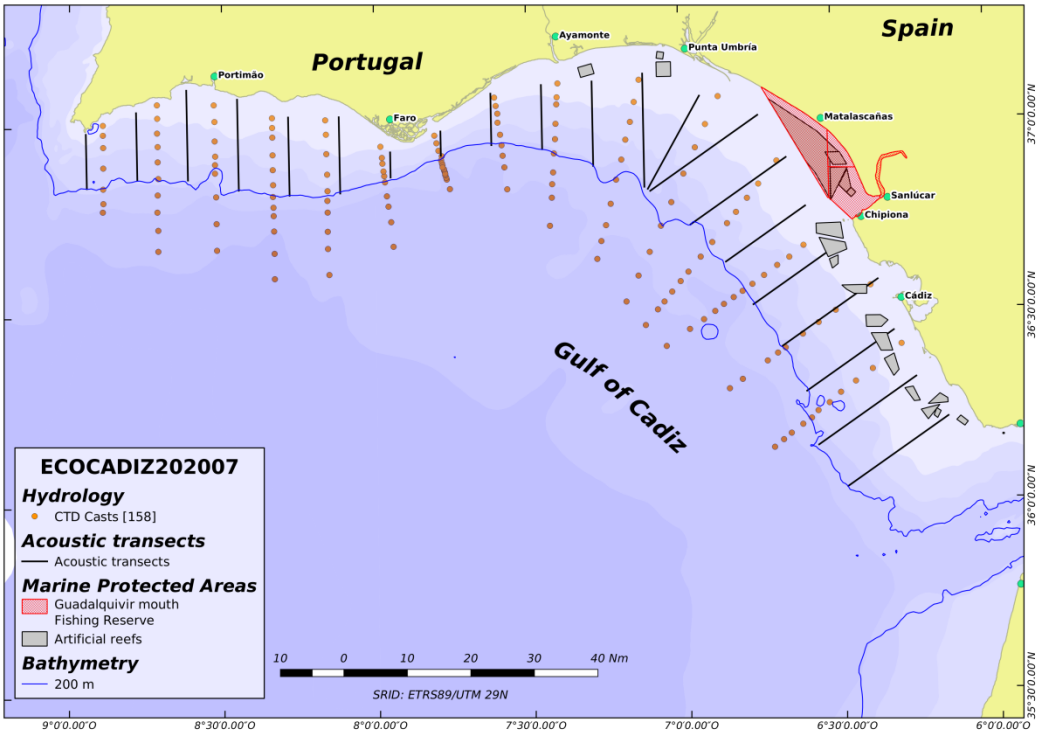



**Figure 2.** *ECOCADIZ 2020-07* survey. Location of CTD-LADCP stations.

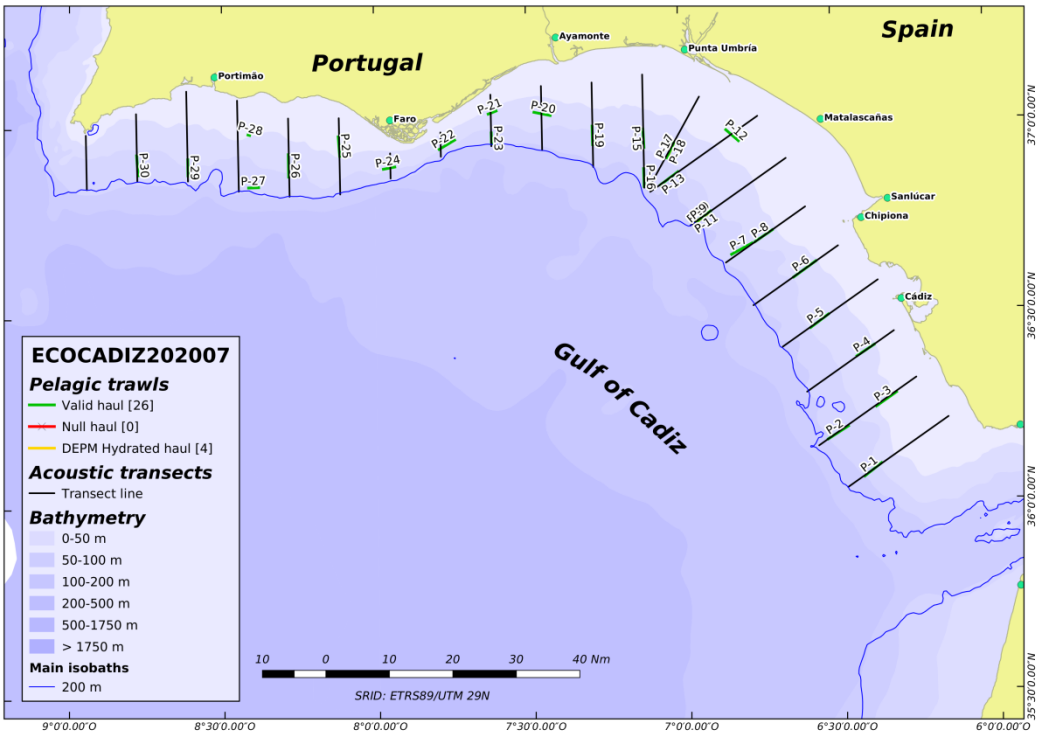



**Figure 3.** *ECOCADIZ 2020-07* survey. Location of ground-truthing fishing hauls.

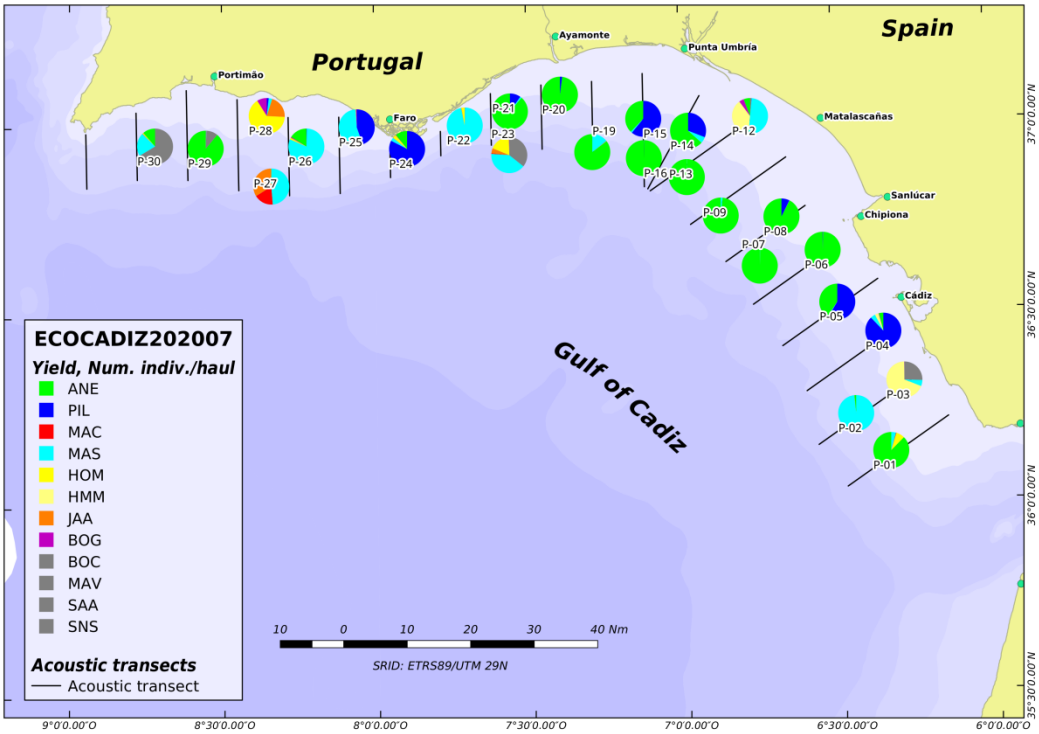



**Figure 4.** *ECOCADIZ 2020-07* survey. Species composition (percentages in number) in fishing hauls.

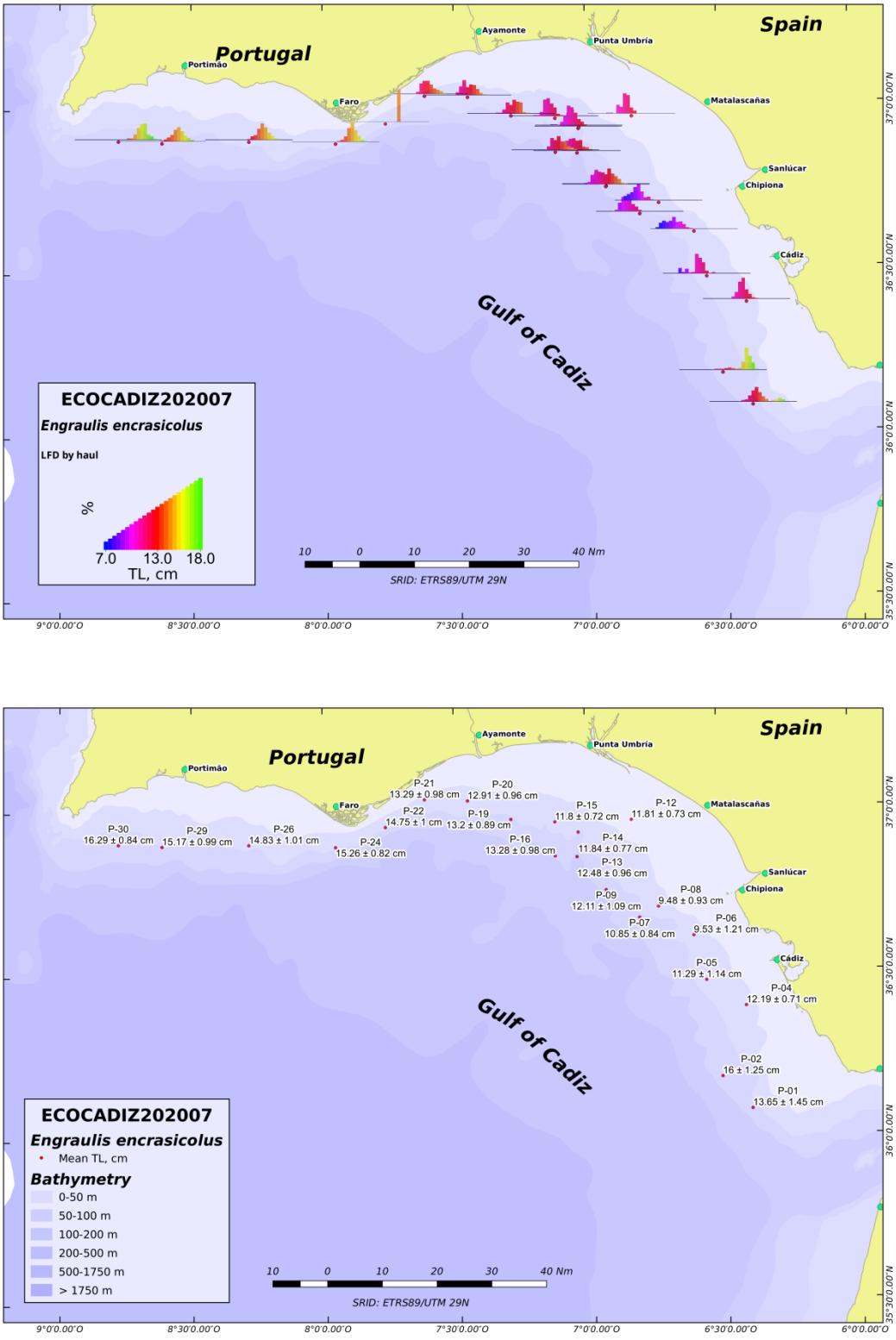



**Figure 5.** *ECOCADIZ 2020-07* survey. *Engraulis encrasicolus*. Top: length frequency distributions in fishing hauls. Bottom: mean ± sd length by haul.

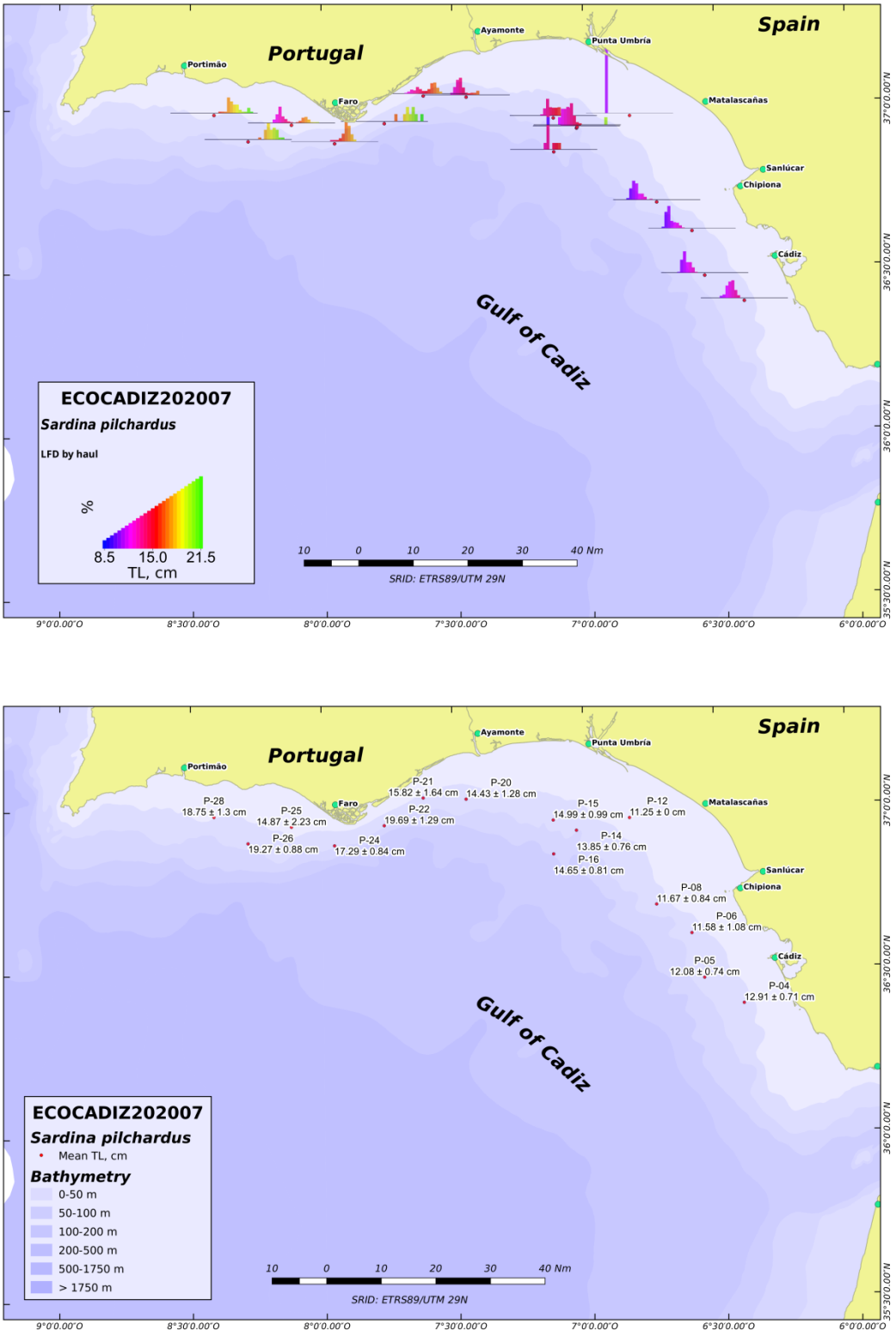



**Figure 6.** *ECOCADIZ 2020-07* survey. *Sardina pilchardus*. Top: length frequency distributions in fishing hauls. Bottom: mean ± sd length by haul.

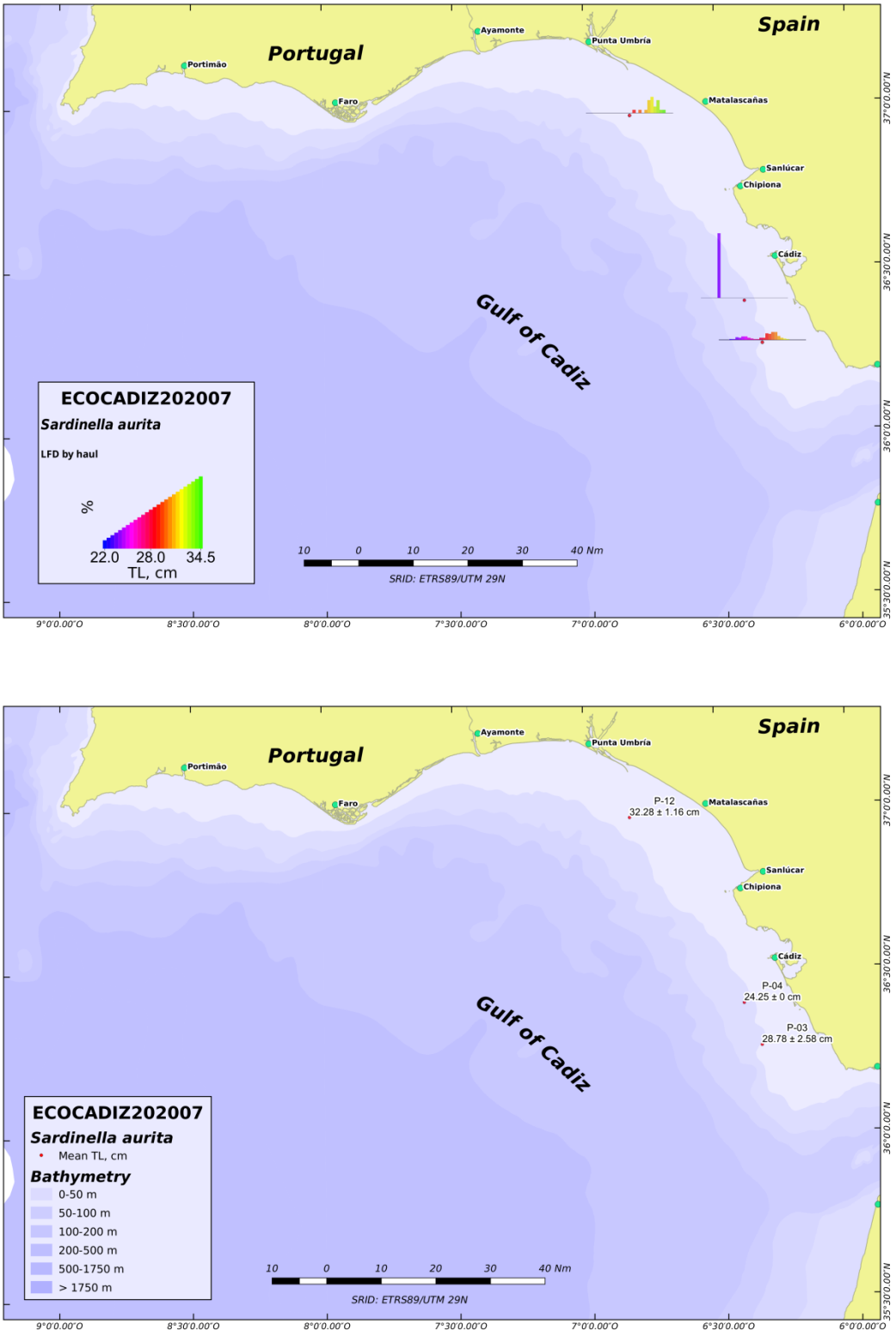



**Figure 7.** *ECOCADIZ 2020-07* survey. *Sardinella aurita*. Top: length frequency distributions in fishing hauls. Bottom: mean ± sd length by haul.

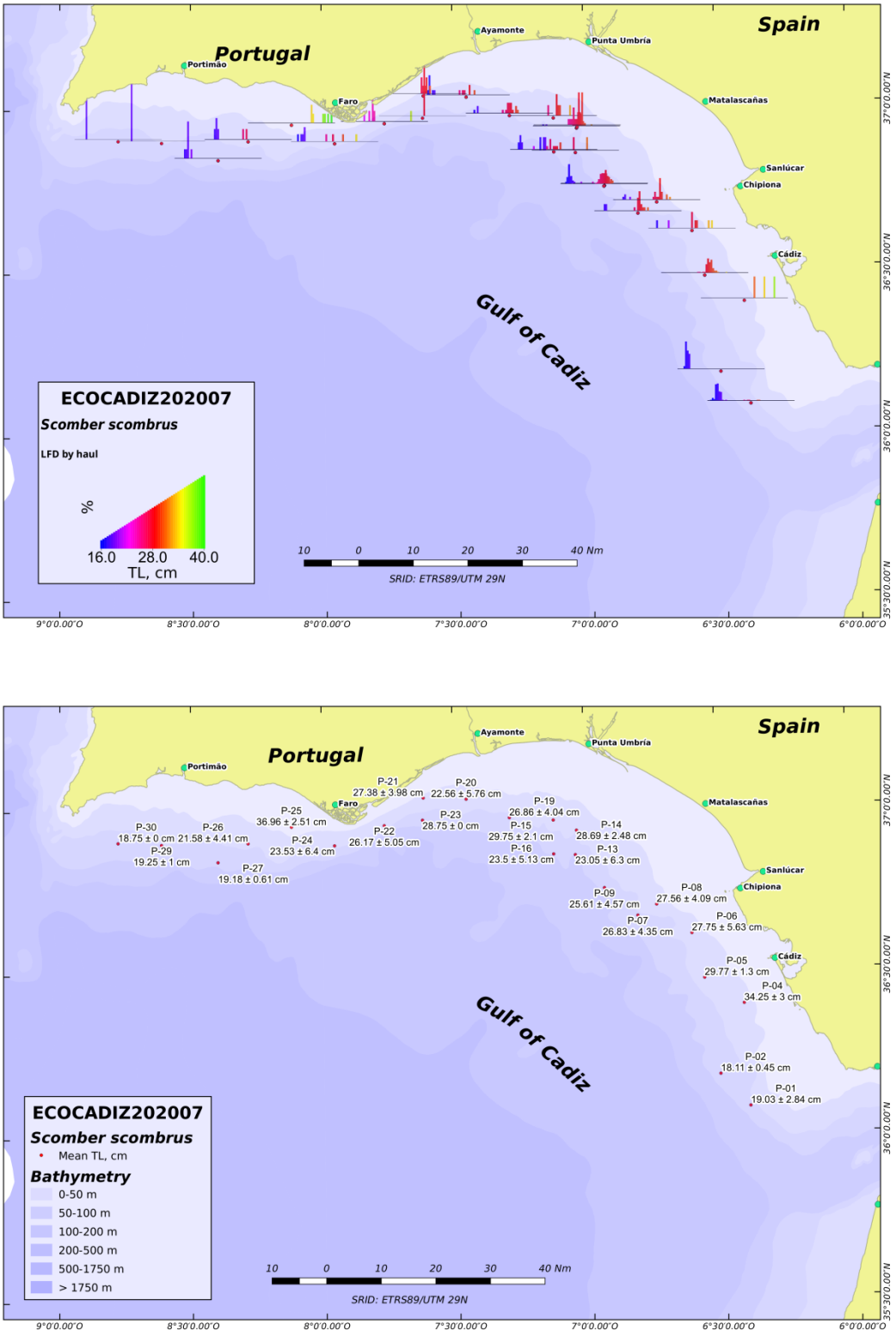



**Figure 8.** *ECOCADIZ 2020-07* survey. *Scomber scombrus*. Top: length frequency distributions in fishing hauls. Bottom: mean ± sd length by haul.

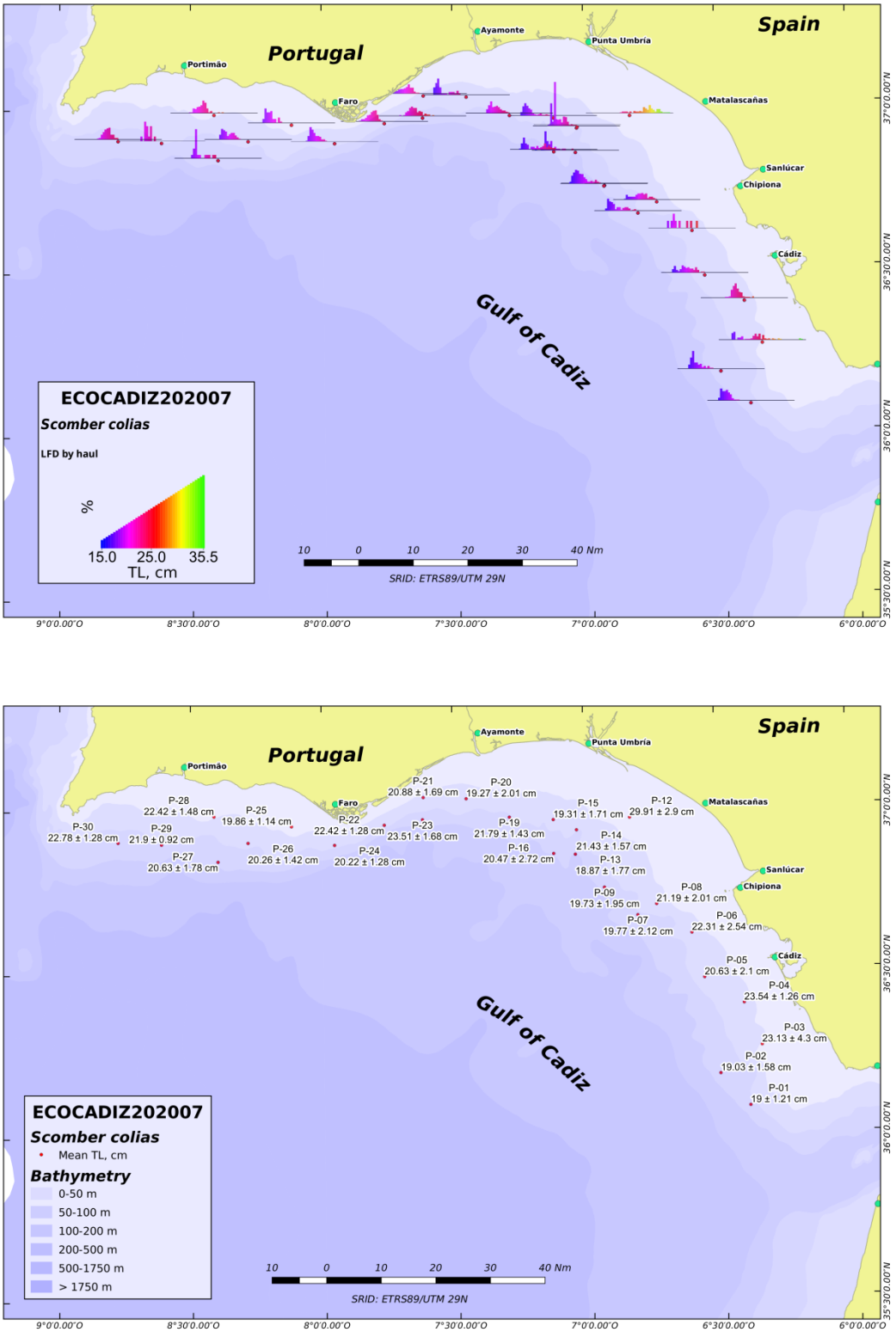



**Figure 9.** *ECOCADIZ 2020-07* survey. *Scomber colias*. Top: length frequency distributions in fishing hauls. Bottom: mean ± sd length by haul.

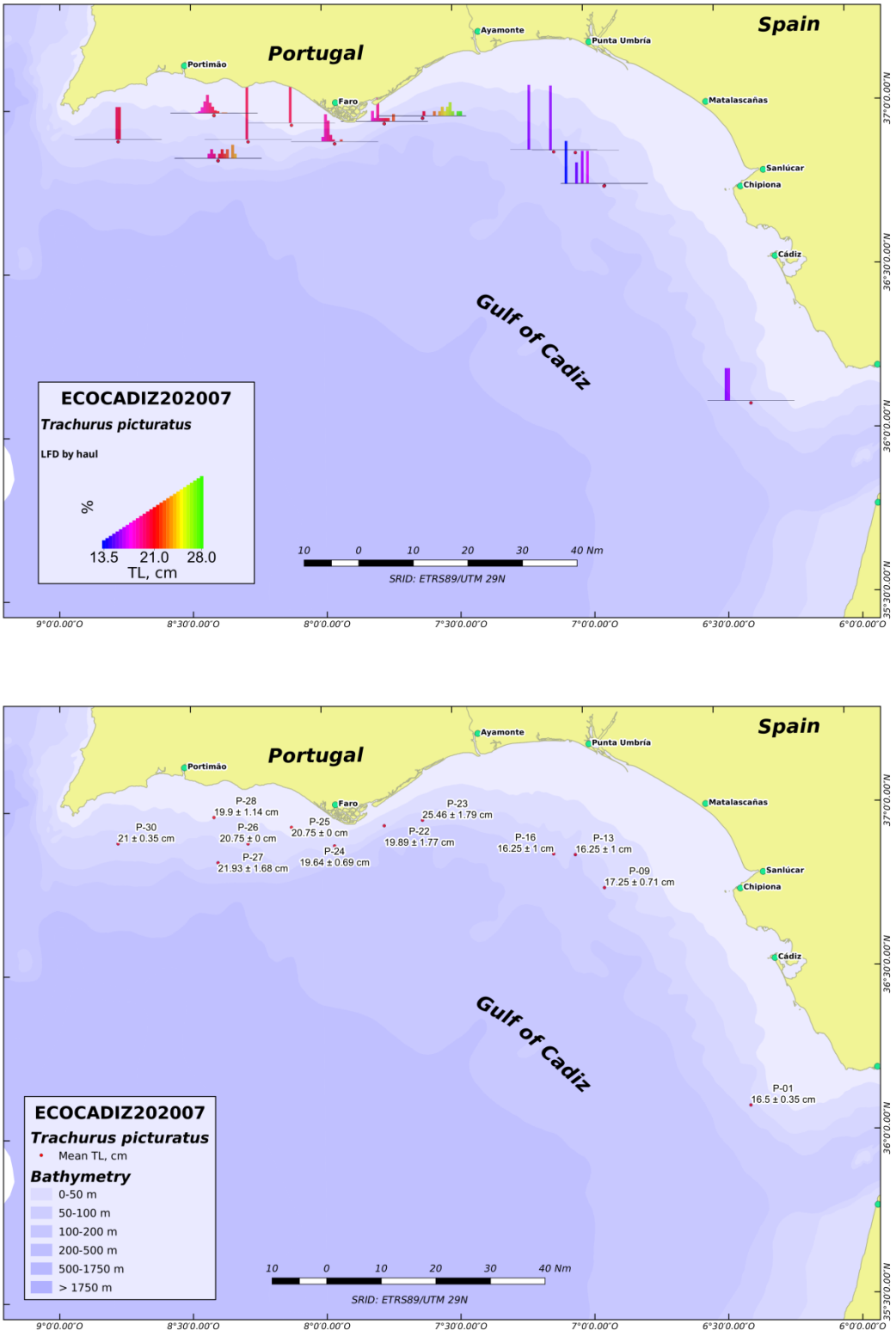



**Figure 10.** *ECOCADIZ 2020-07* survey. *Trachurus picturatus*. Top: length frequency distributions in fishing hauls. Bottom: mean ± sd length by haul.

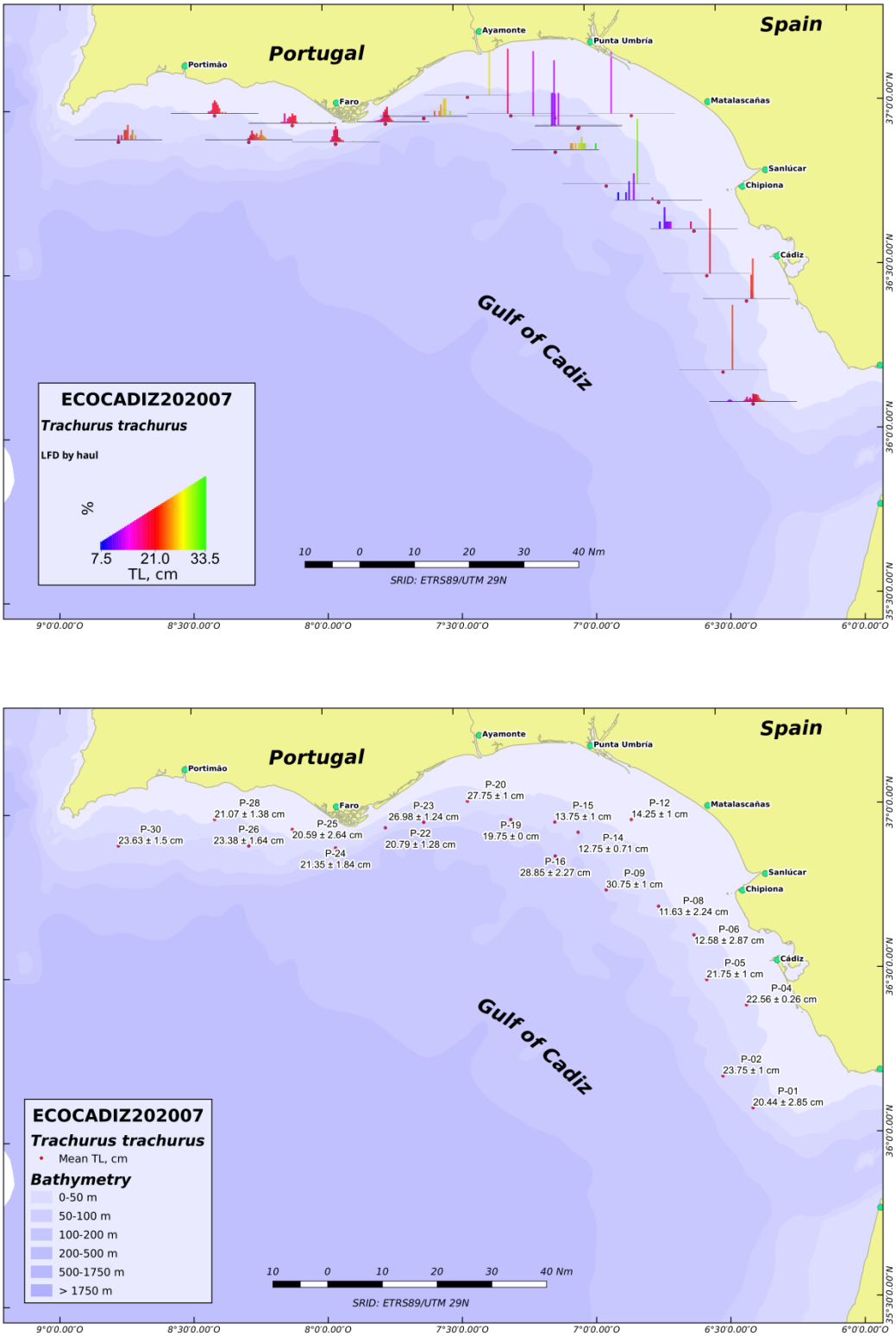



**Figure 11.** *ECOCADIZ 2020-07* survey. *Trachurus trachurus*. Top: length frequency distributions in fishing hauls. Bottom: mean ± sd length by haul.

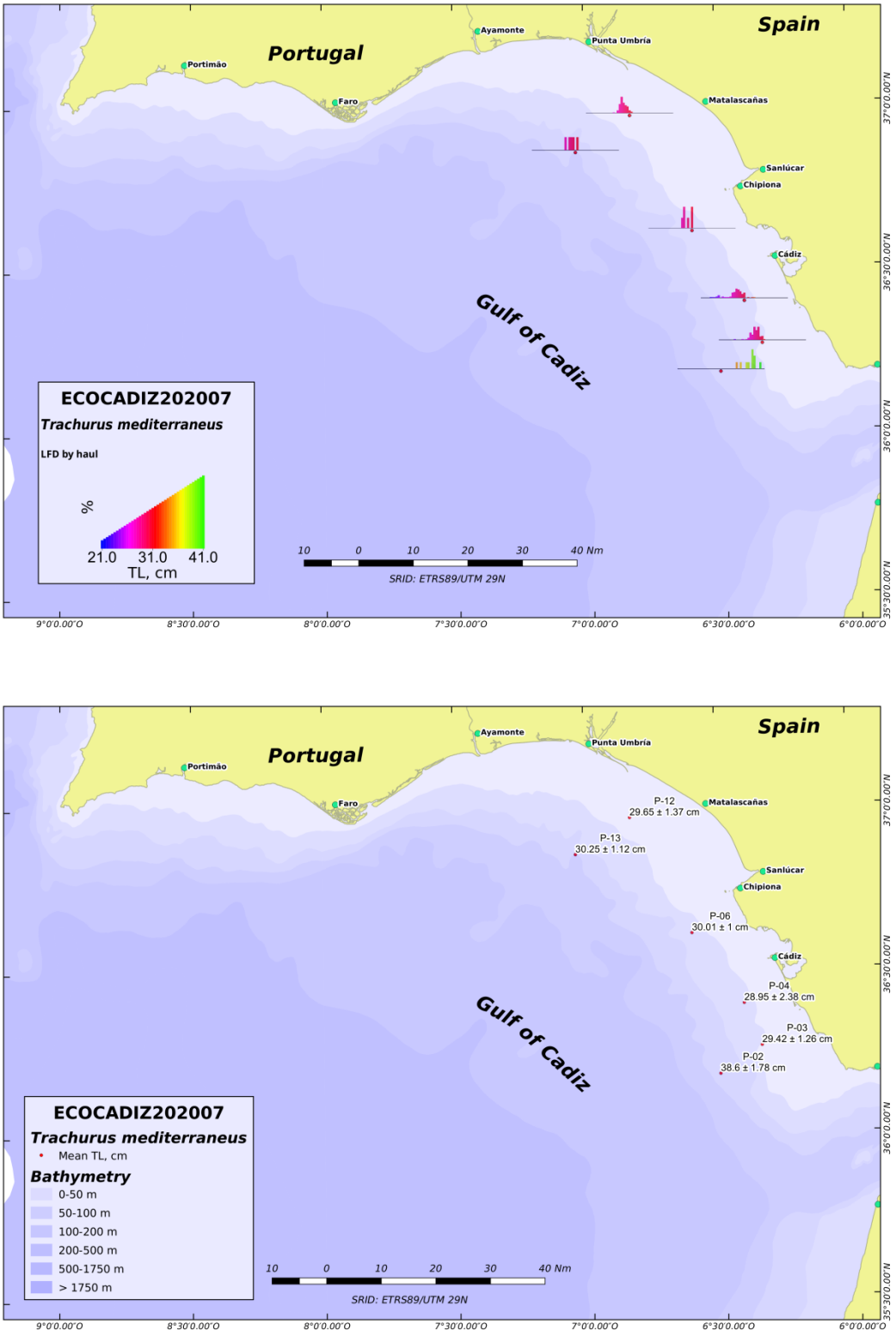



**Figure 12.** *ECOCADIZ 2020-07* survey. *Trachurus mediterraneus*. Top: length frequency distributions in fishing hauls. Bottom: mean ± sd length by haul.

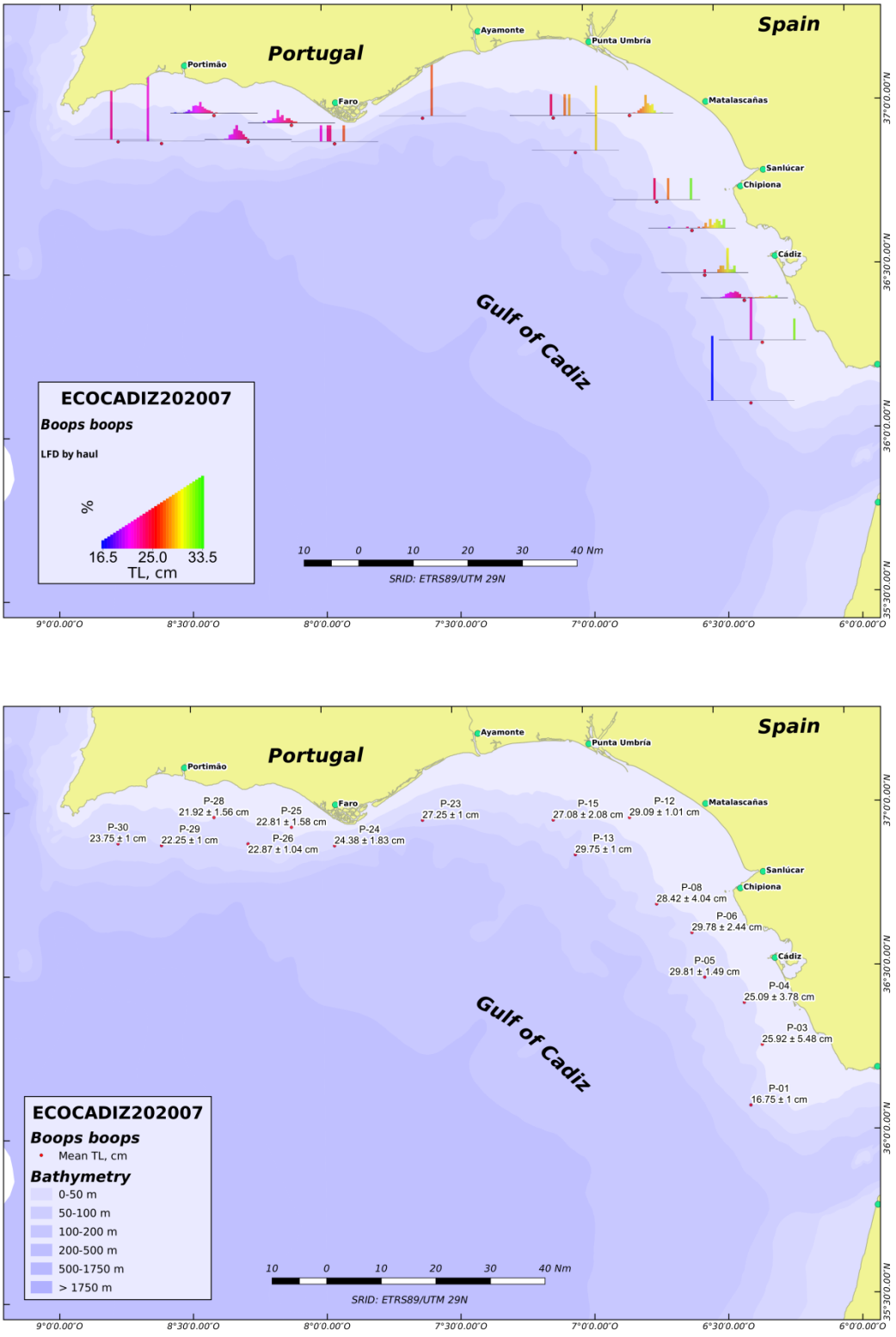
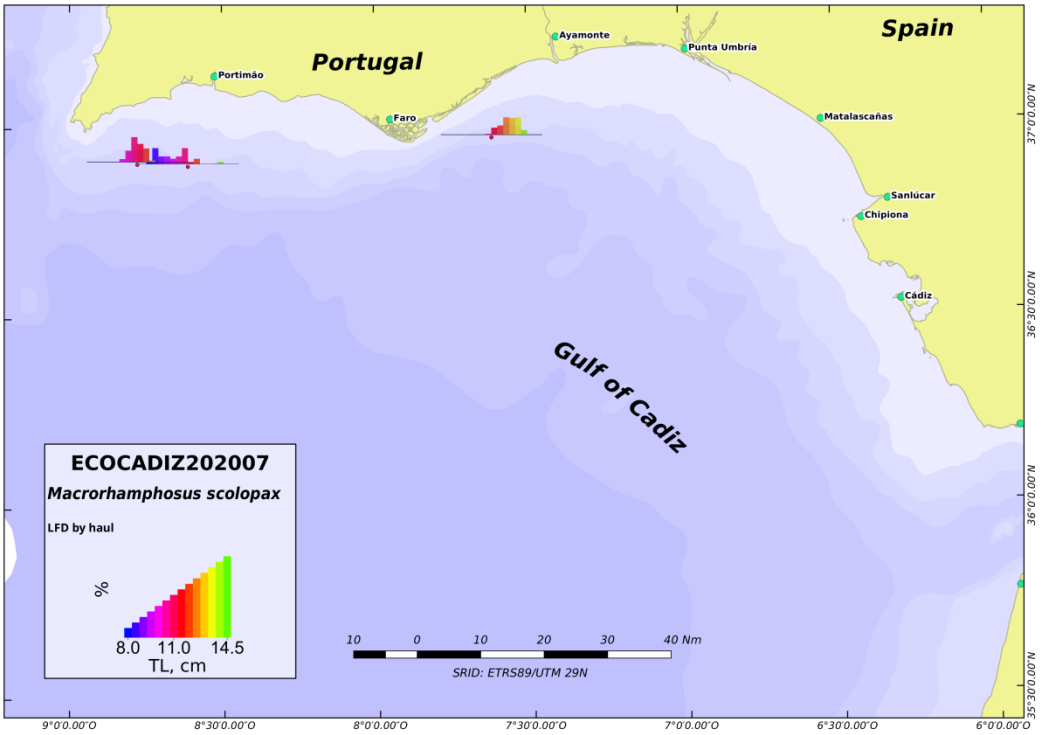



**Figure 13.** *ECOCADIZ 2020-07* survey. *Boops boops*. Top: length frequency distributions in fishing hauls. Bottom: mean ± sd length by haul.



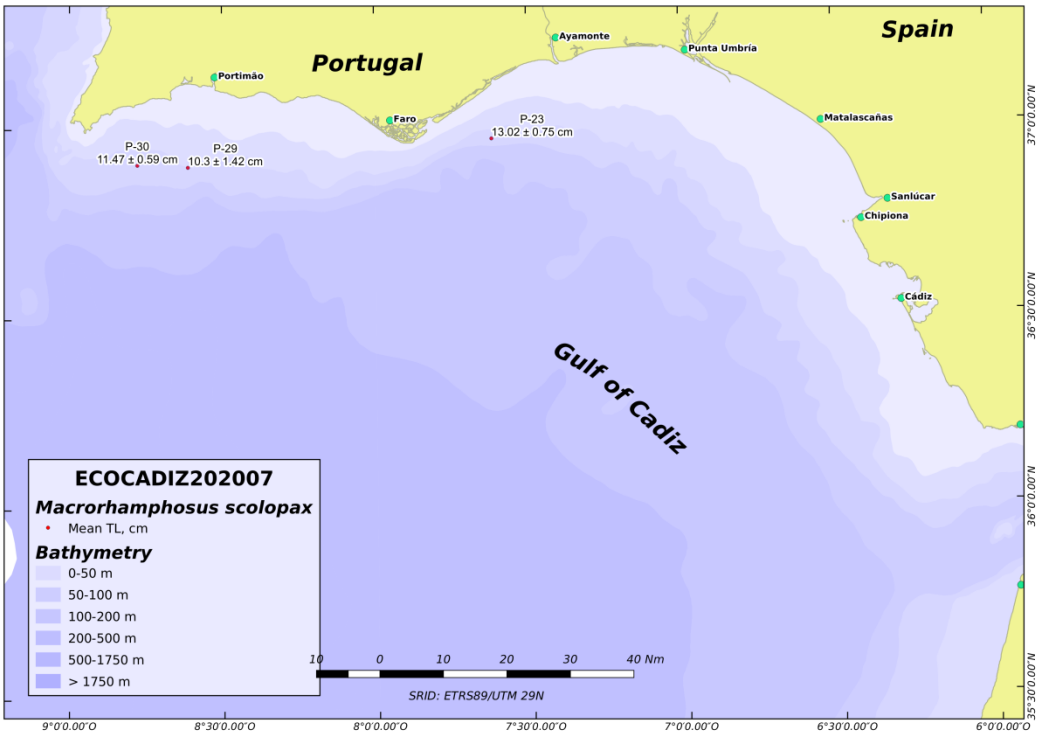




**Figure 14.** *ECOCADIZ 2020-07* survey. *Macrorhamphosus scolopax*. Top: length frequency distributions in fishing hauls. Bottom: mean ± sd length by haul.

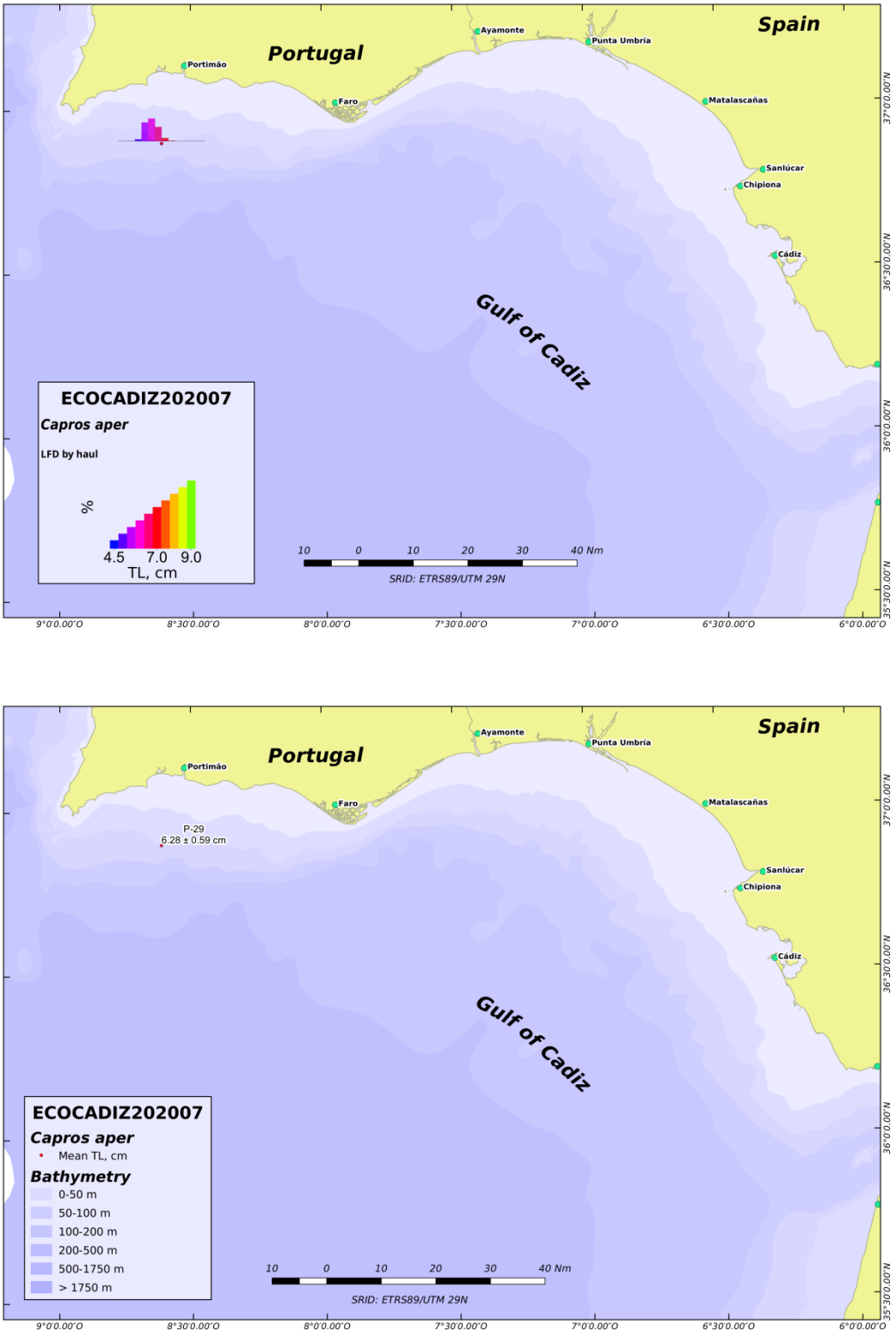



**Figure 15.** *ECOCADIZ 2020-07* survey. *Capros aper*. Top: length frequency distributions in fishing hauls. Bottom: mean ± sd length by haul.

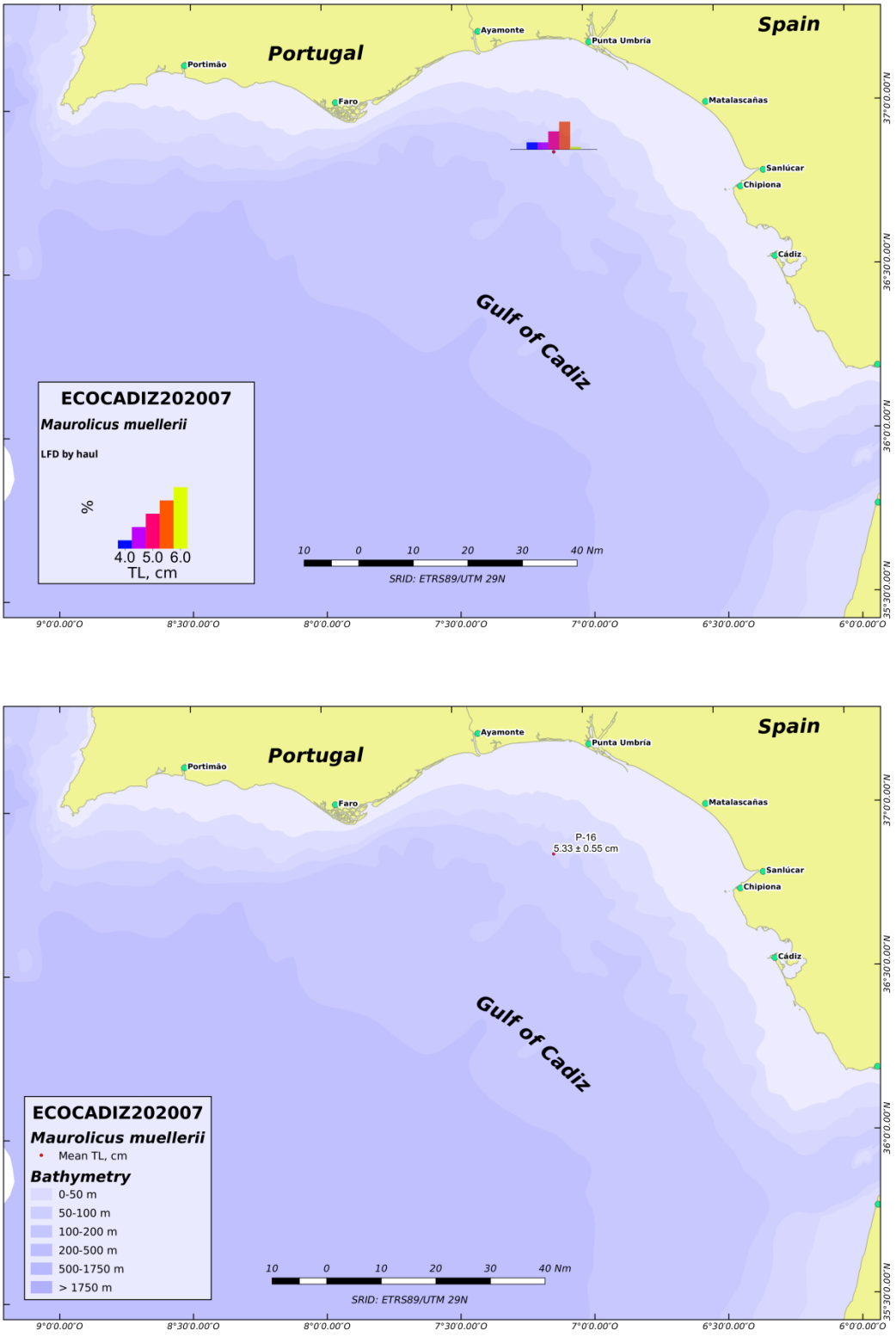



**Figure 16.** *ECOCADIZ 2020-07* survey. *Maurolicus muelleri*. Top: length frequency distributions in fishing hauls. Bottom: mean ± sd length by haul.

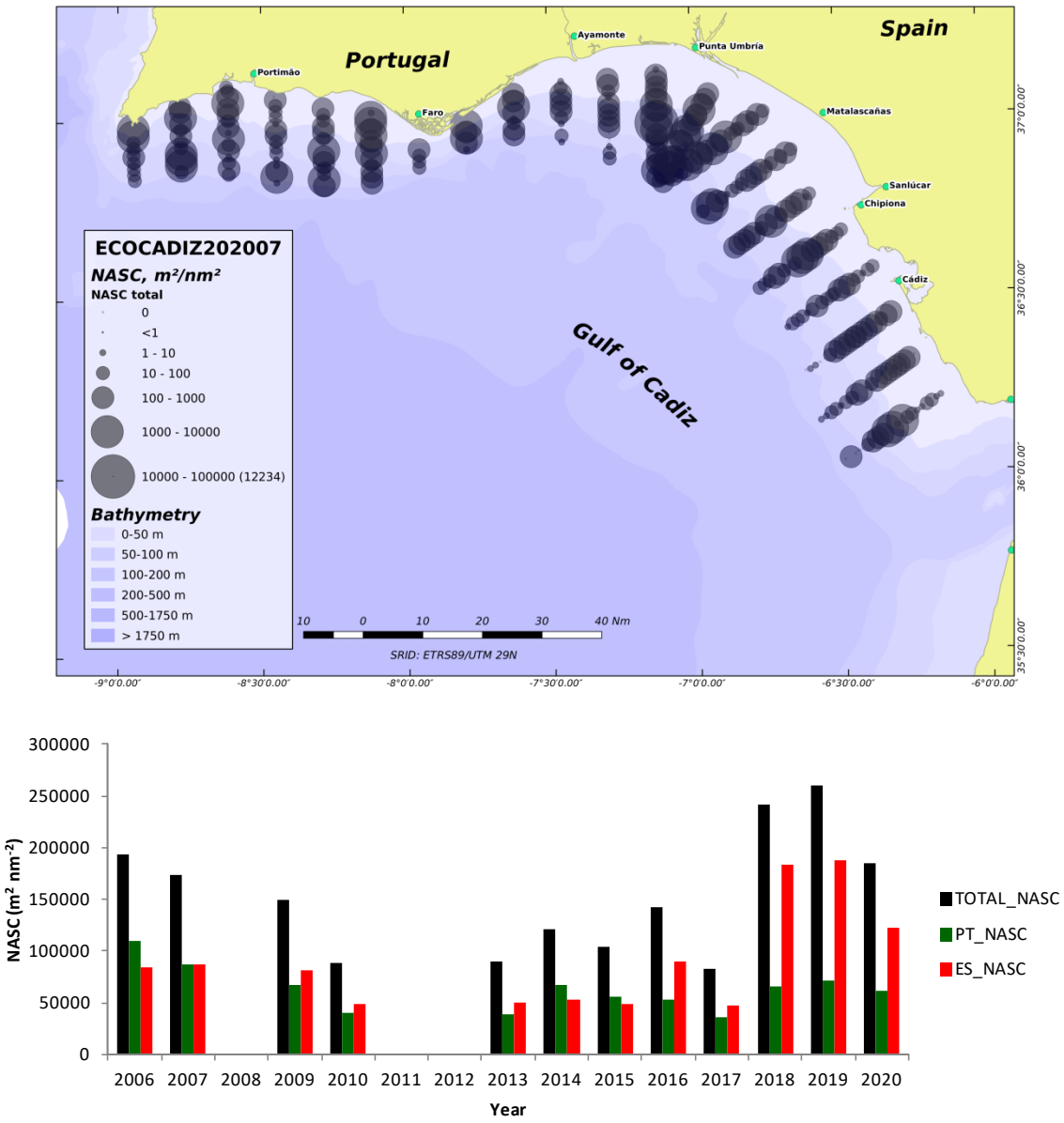



**Figure 17.** *ECOCADIZ 2020-07* survey. Top: distribution of the total backscattering energy (Nautical area scattering coefficient, *NASC*, in $m^2$ $nmi^{-2}$) attributed to the pelagic fish species assemblage. Bottom: time-series of total NASC estimates per survey.

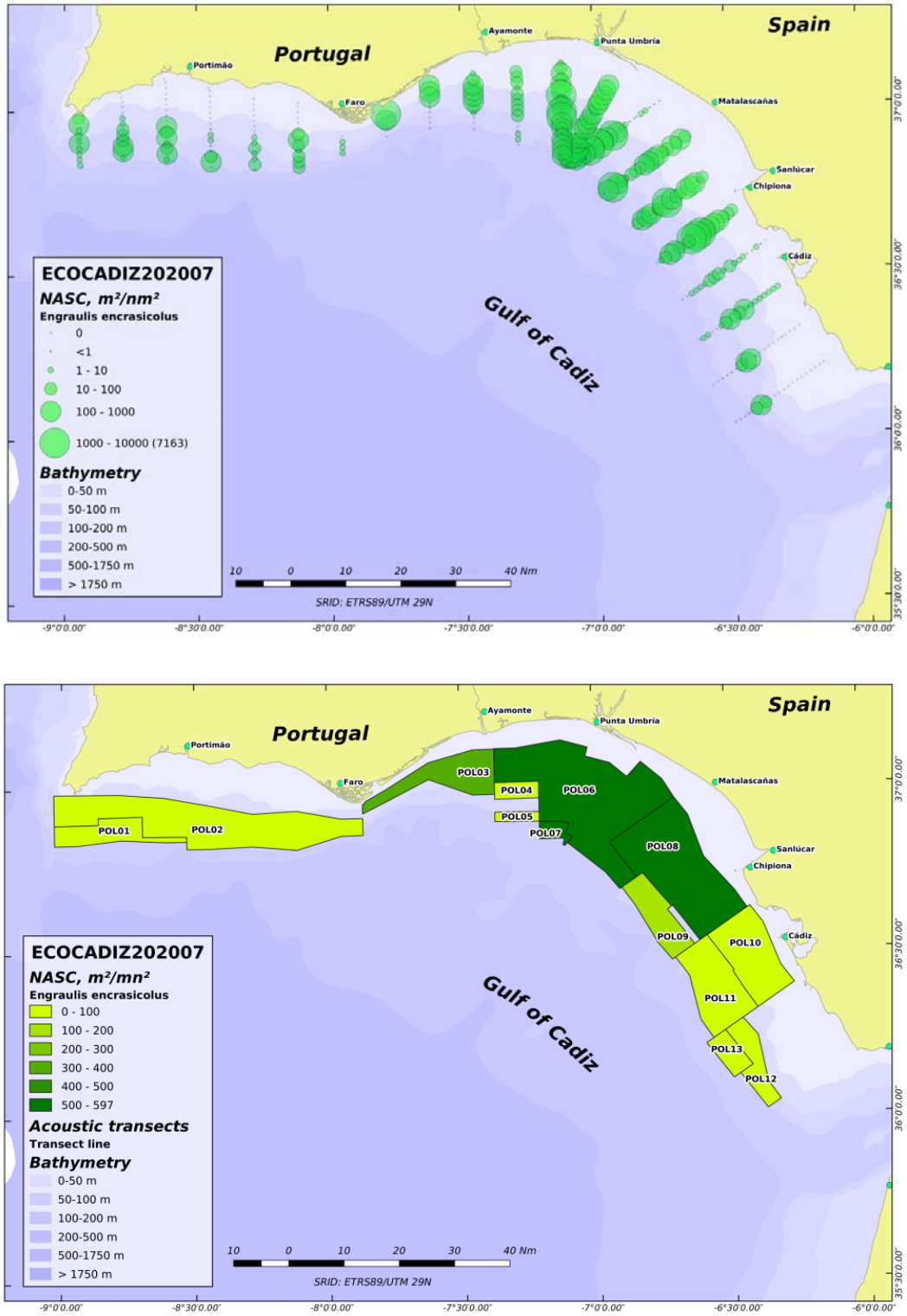



**Figure 18.** *ECOCADIZ 2020-07* survey. Anchovy (*Engraulis encrasicolus*). Top: distribution of the total backscattering energy (Nautical area scattering coefficient, *NASC*, in $m^2$ $nmi^{-2}$) attributed to the species. Bottom: distribution of homogeneous size-based post-strata used in the biomass/abundance estimates. Colour scale according to the mean value of the backscattering energy attributed to the species in each stratum.

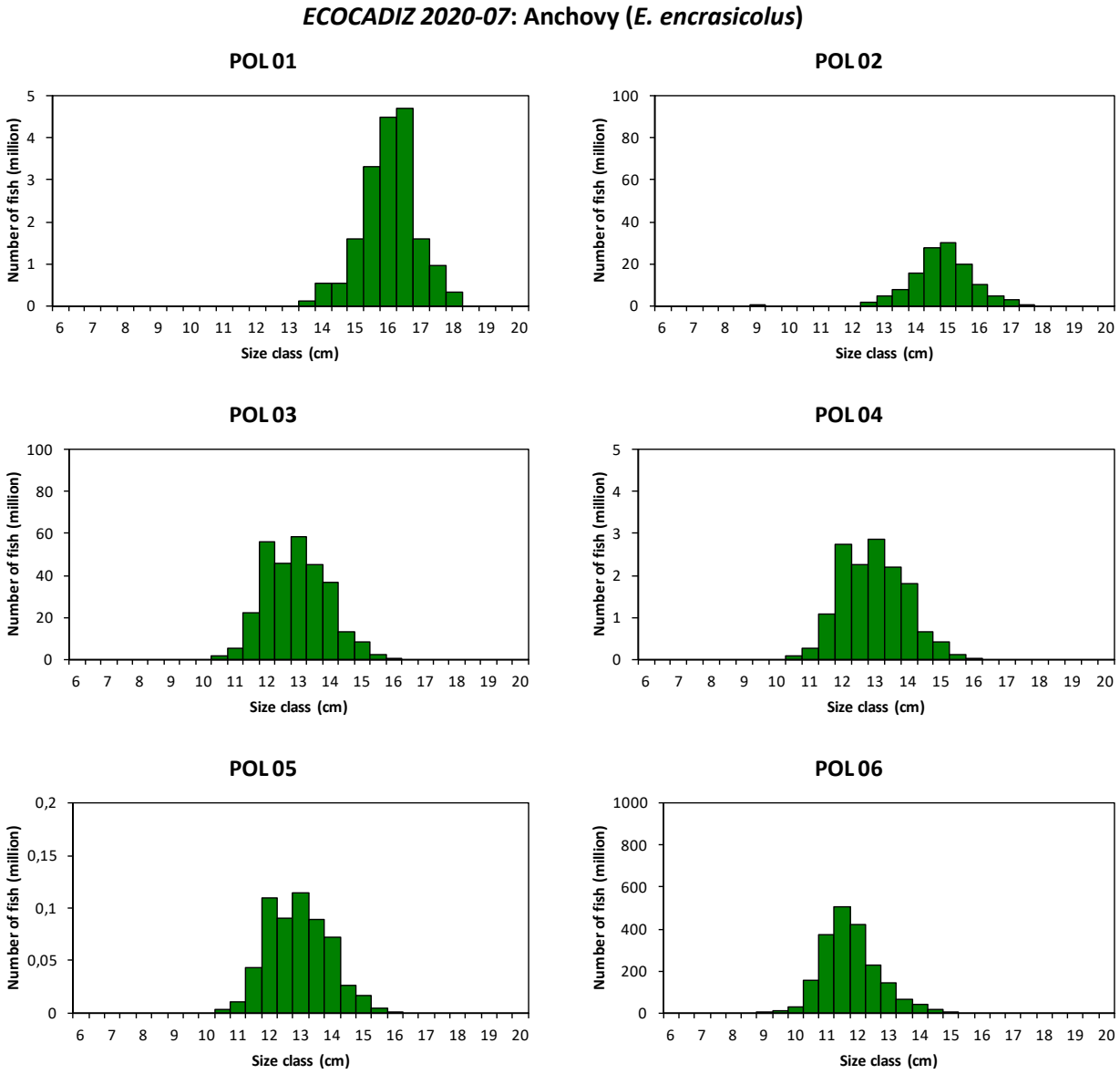



**Figure 19.** *ECOCADIZ 2020-07* survey. Anchovy (*E. encrasicolus*). Estimated abundances (number of fish in millions) by length class (cm) by homogeneous stratum (POL01-POLn, numeration as in **Figure 18**) and total sampled area. Post-strata ordered in the W-E direction. The estimated biomass (t) by size class for the whole sampled area is also shown for comparison. Note the different scales in the y axis.

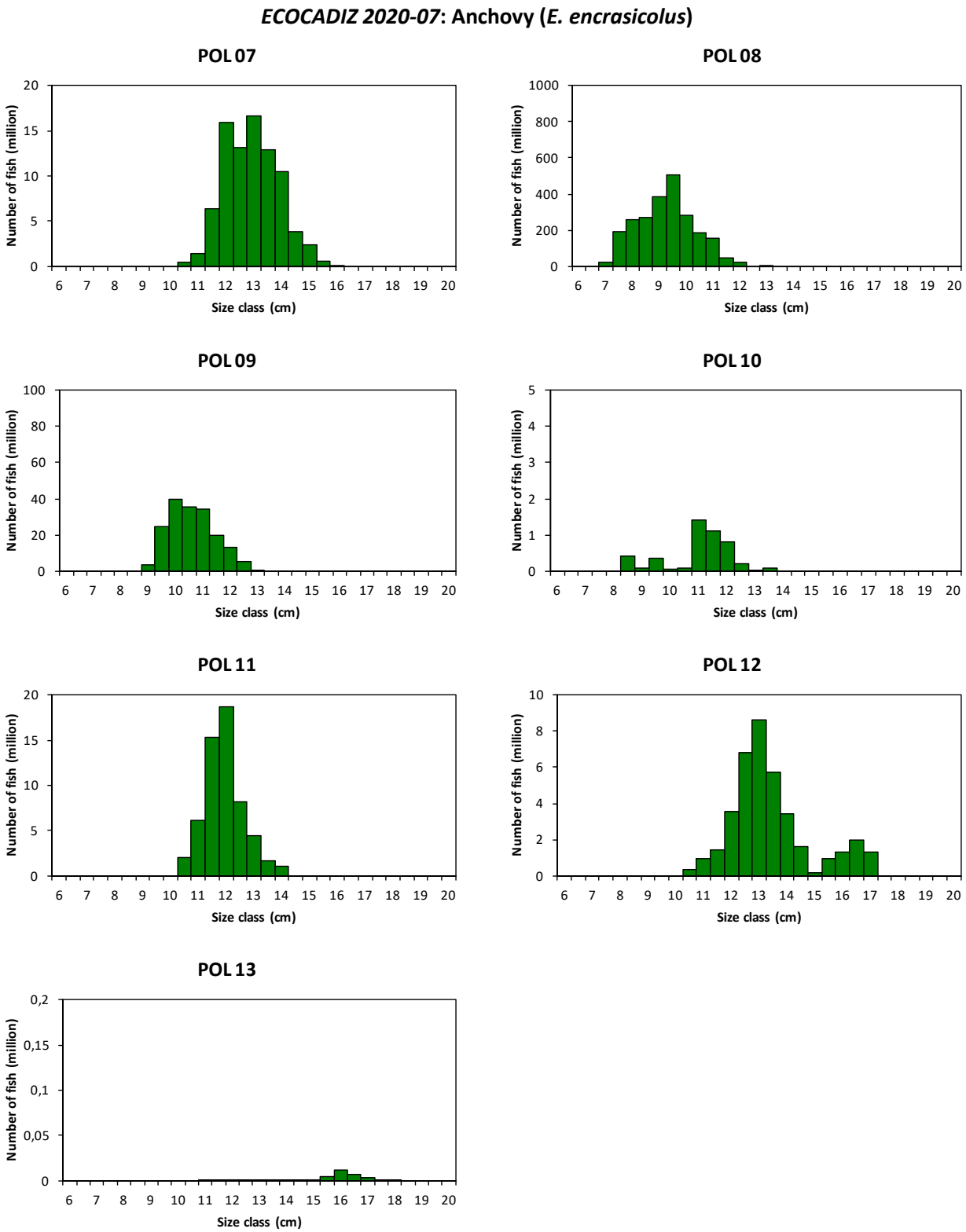



**Figure 19.** *ECOCADIZ 2020-07* survey. Anchovy (*E. encrasicolus*). Cont'd.

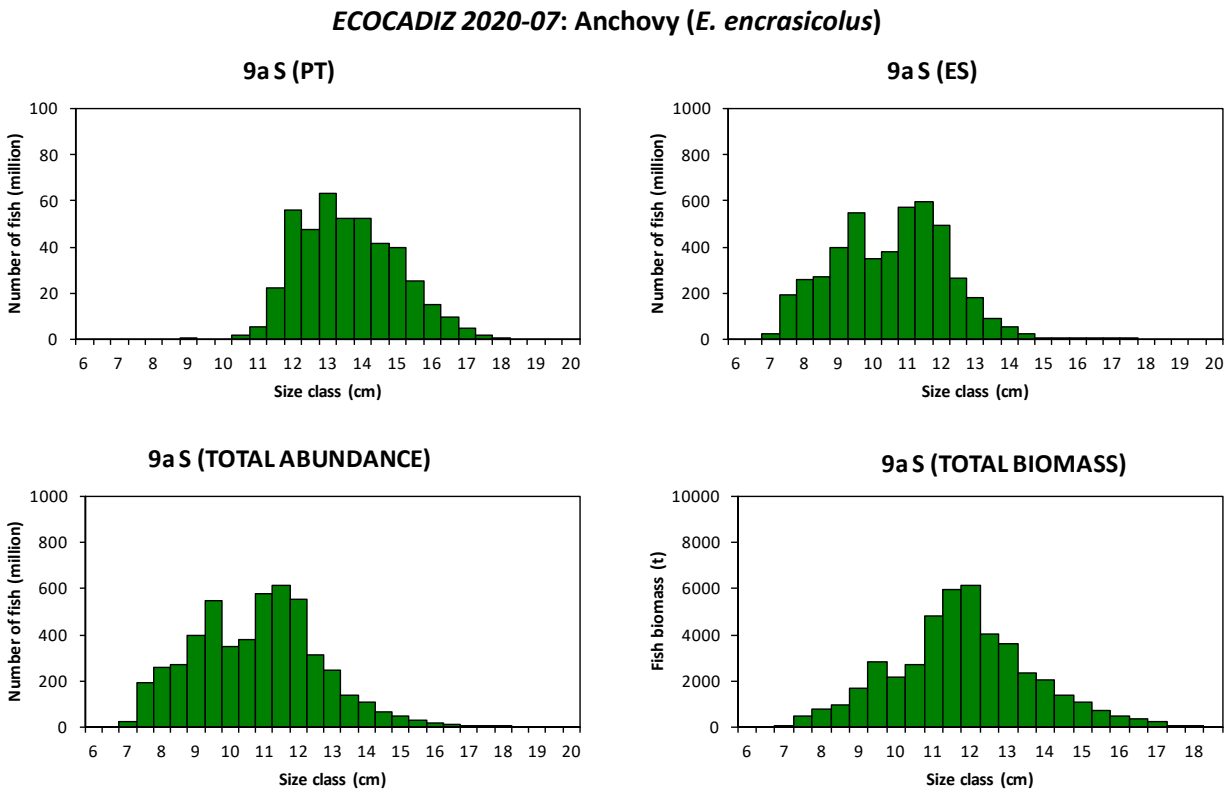



**Figure 19.** *ECOCADIZ 2020-07* survey. Anchovy (*E. encrasicolus*). Cont'd.

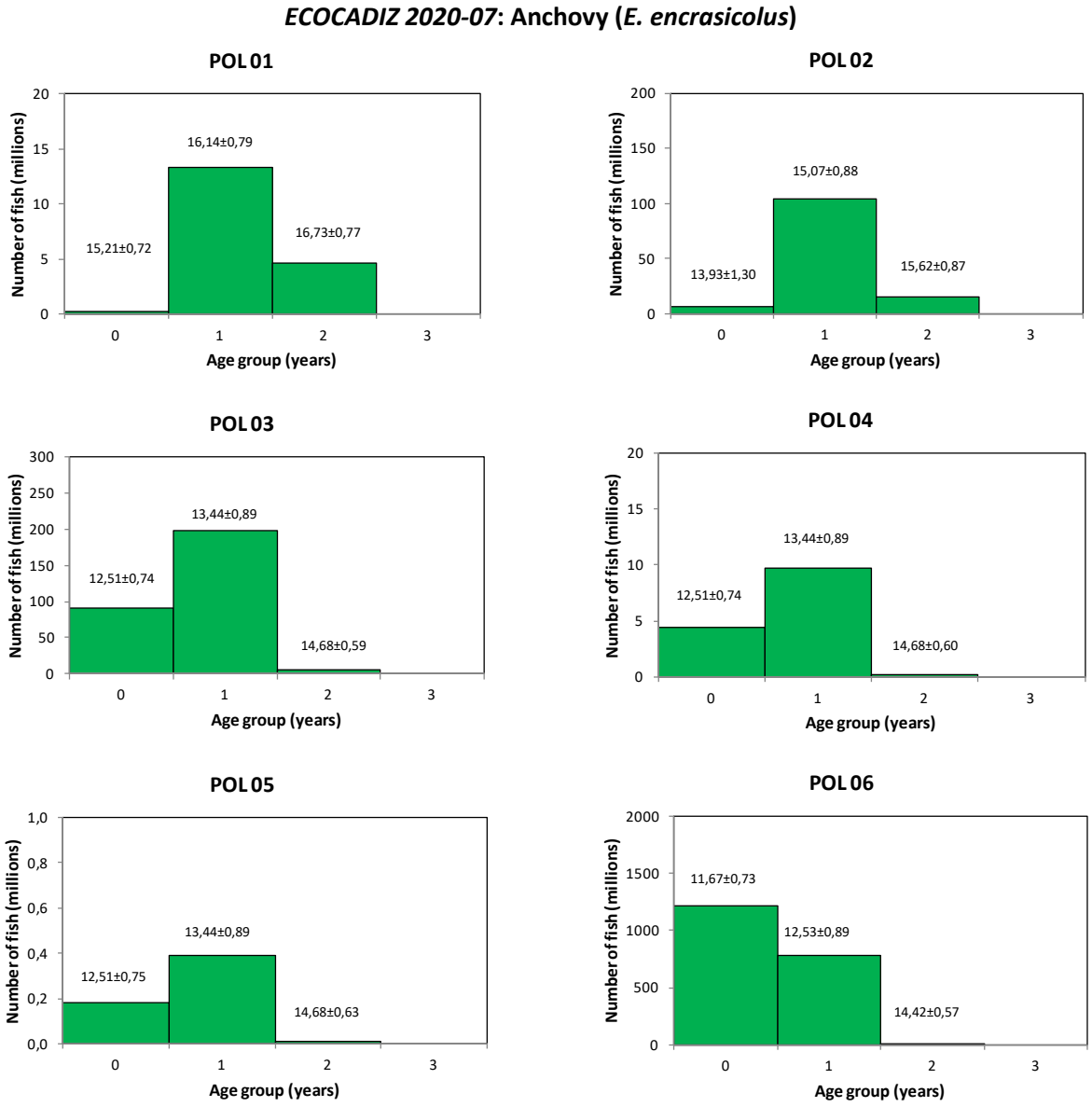



**Figure 20.** *ECOCADIZ 2020-07* survey. Anchovy (*E. encrasicolus*). Estimated abundances (number of fish in millions) by age group (years) by homogeneous stratum (POL01-POLn, numeration as in **Figure 18**) and total sampled area. Post-strata ordered in the W-E direction. Mean (±SD) sizes of age groups are also shown. The estimated biomass (t) by age group for the whole sampled area is shown for comparison. Note the different scales in the y axis.

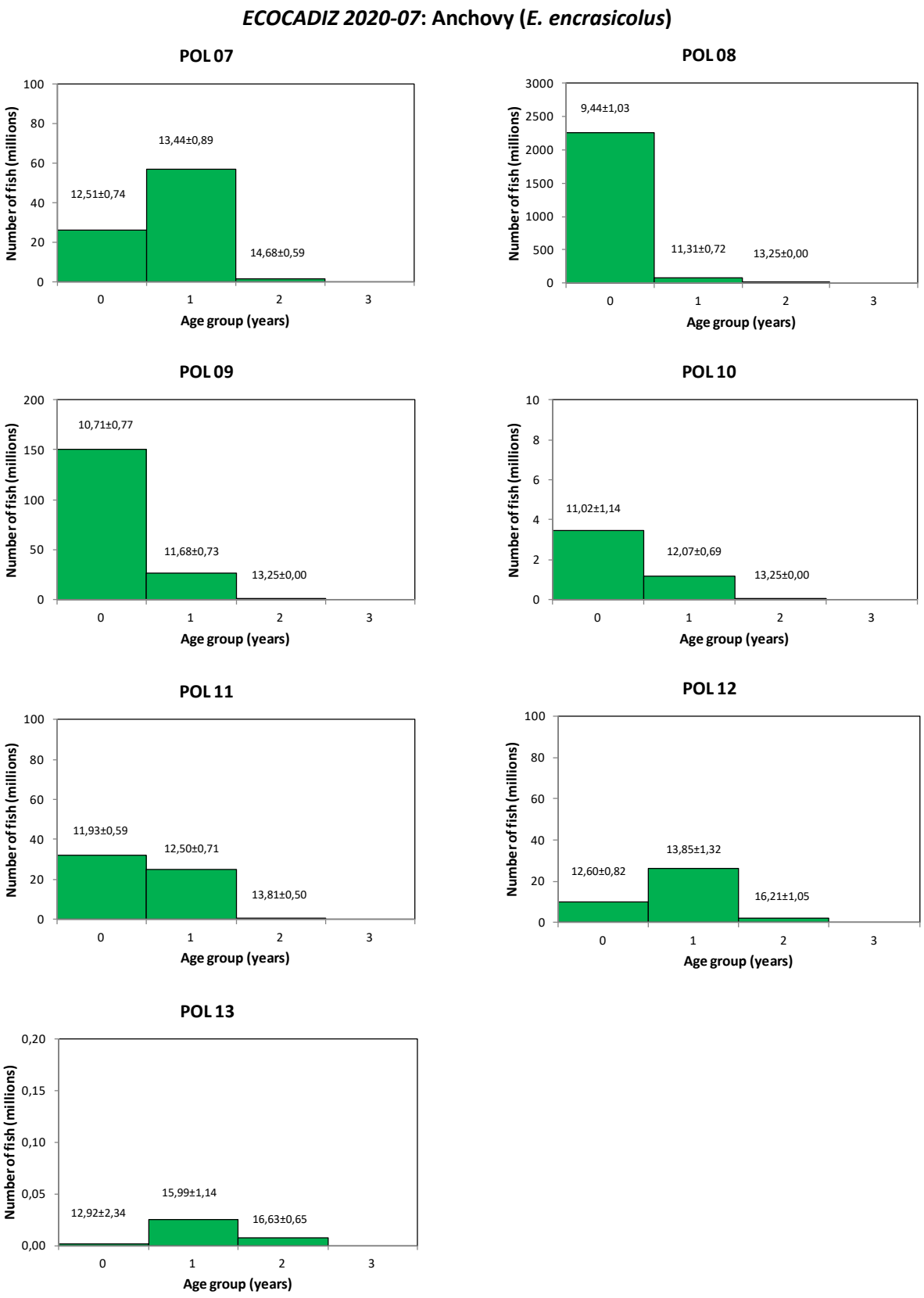



**Figure 20.** *ECOCADIZ 2020-07* survey. Anchovy (*E. encrasicolus*). Cont'd.

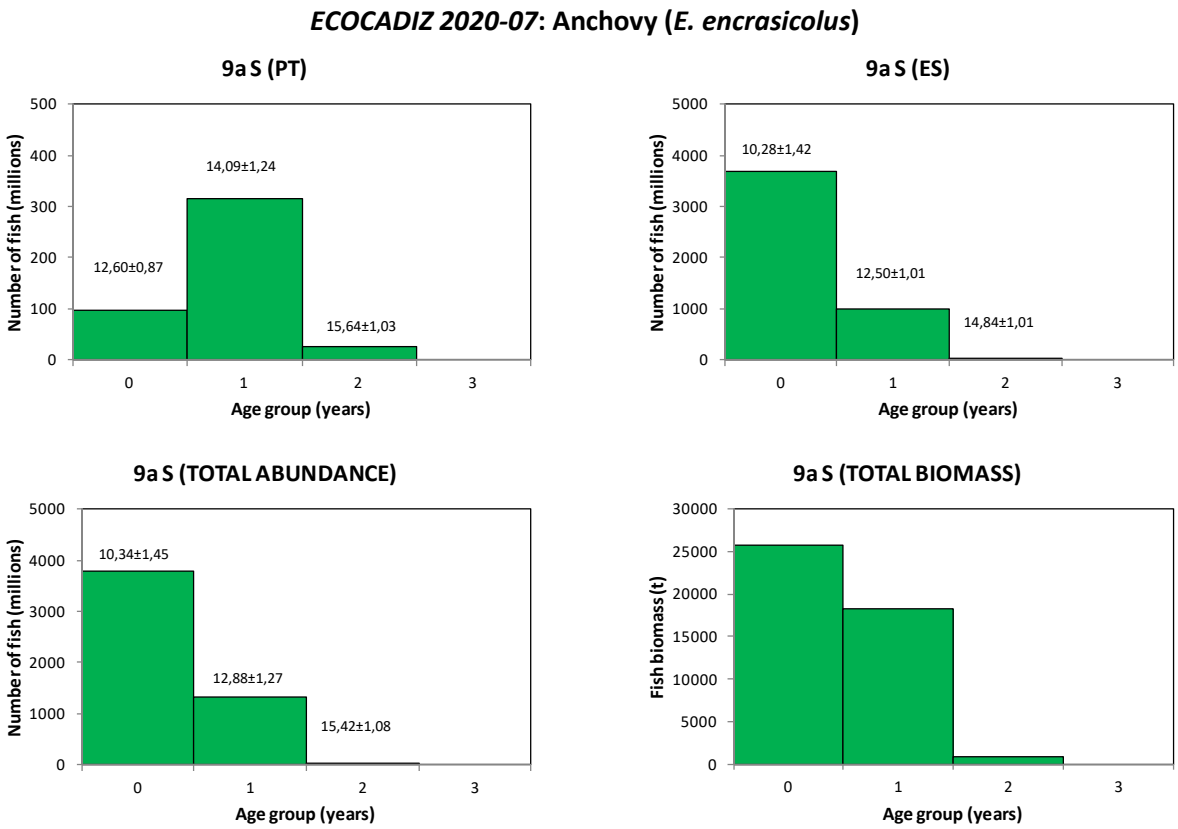



**Figure 20.** *ECOCADIZ 2020-07* survey. Anchovy (*E. encrasicolus*). Cont'd.

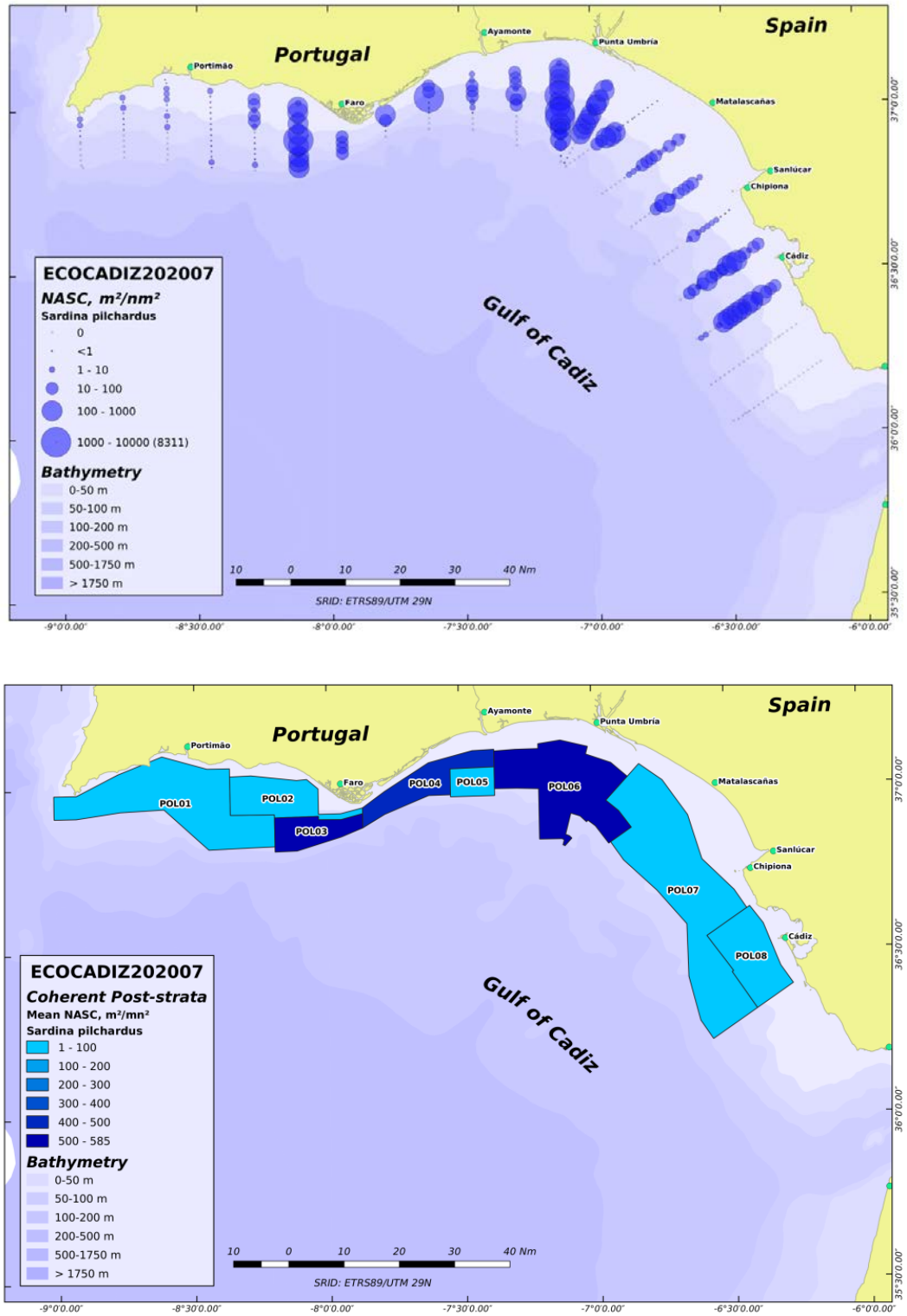



**Figure 21.** *ECOCADIZ 2020-07* survey. Sardine (*Sardina pilchardus*). Top: distribution of the total backscattering energy (Nautical area scattering coefficient, *NASC*, in $m^2$ $nmi^{-2}$) attributed to the species. Bottom: distribution of homogeneous size-based post-strata used in the biomass/abundance estimates. Colour scale according to the mean value of the backscattering energy attributed to the species in each stratum.

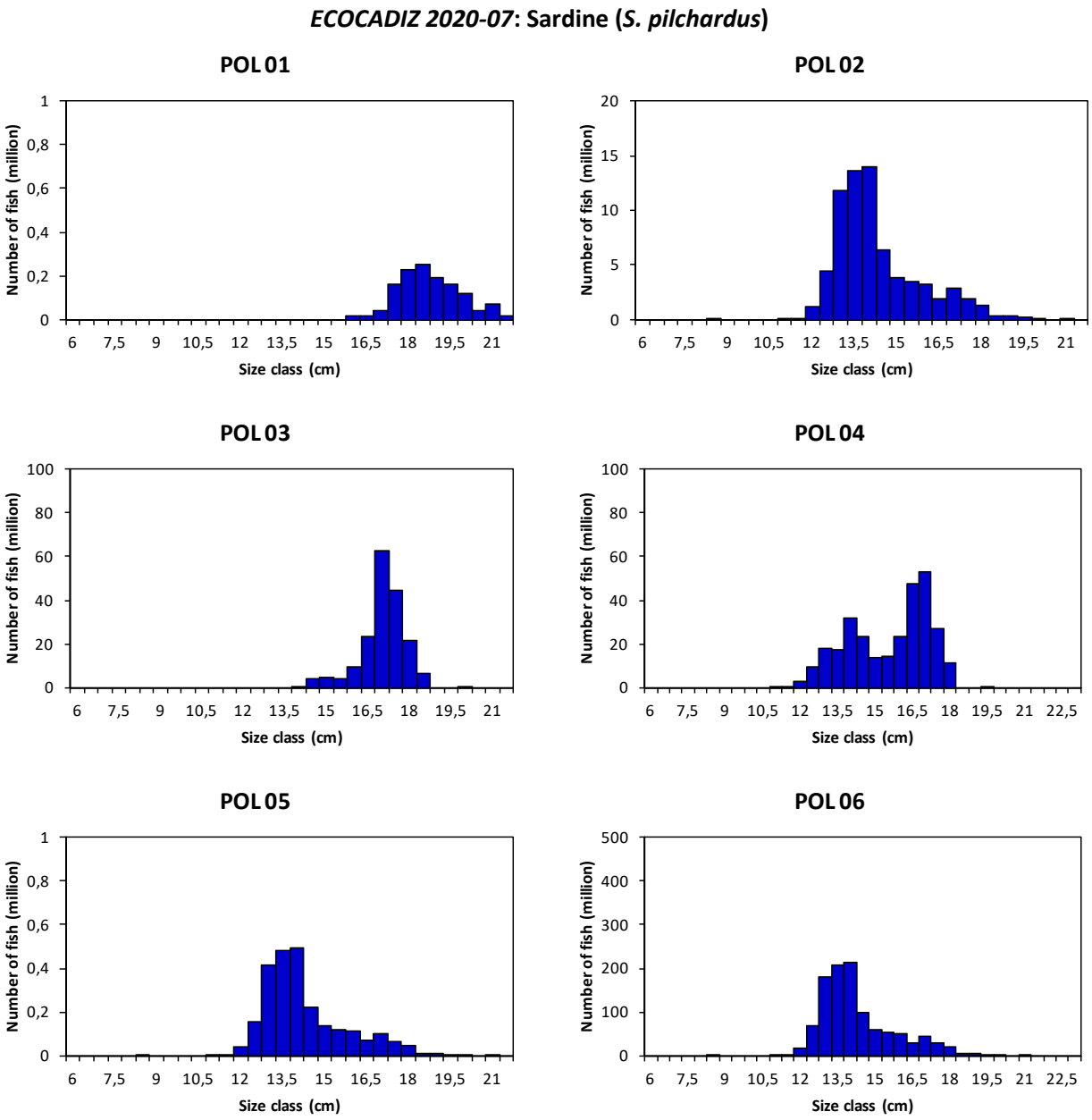



**Figure 22.** *ECOCADIZ 2020-07* survey. Sardine (*S. pilchardus*). Estimated abundances (number of fish in millions) by length class (cm) by homogeneous stratum (POL01-POLn, numeration as in **Figure 21**) and total sampled area. Post-strata ordered in the W-E direction. The estimated biomass (t) by size class for the whole sampled area is also shown for comparison. Note the different scales in the y axis.

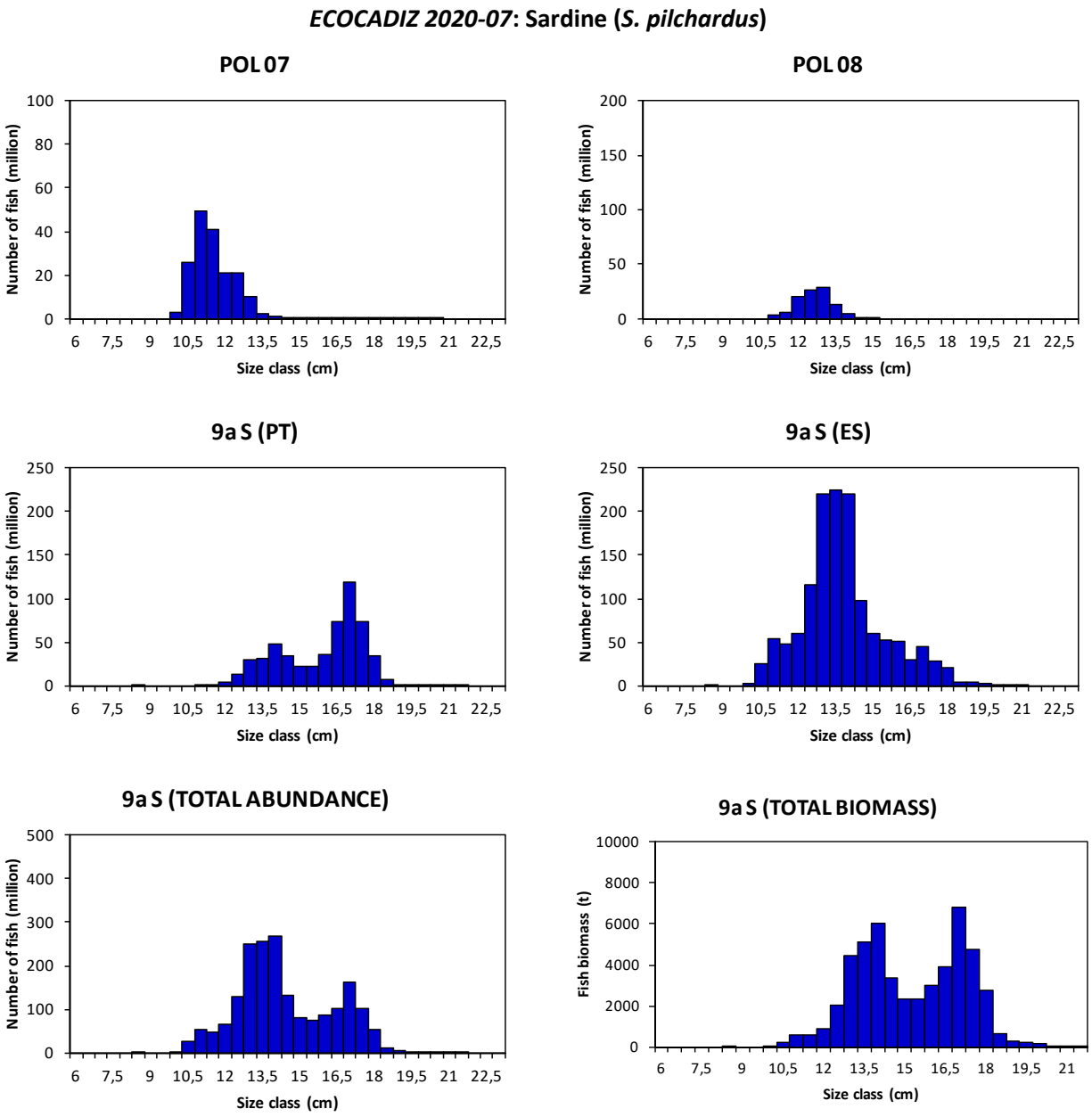



**Figure 22.** *ECOCADIZ 2020-07* survey. Sardine (*S. pilchardus*). Cont'd.

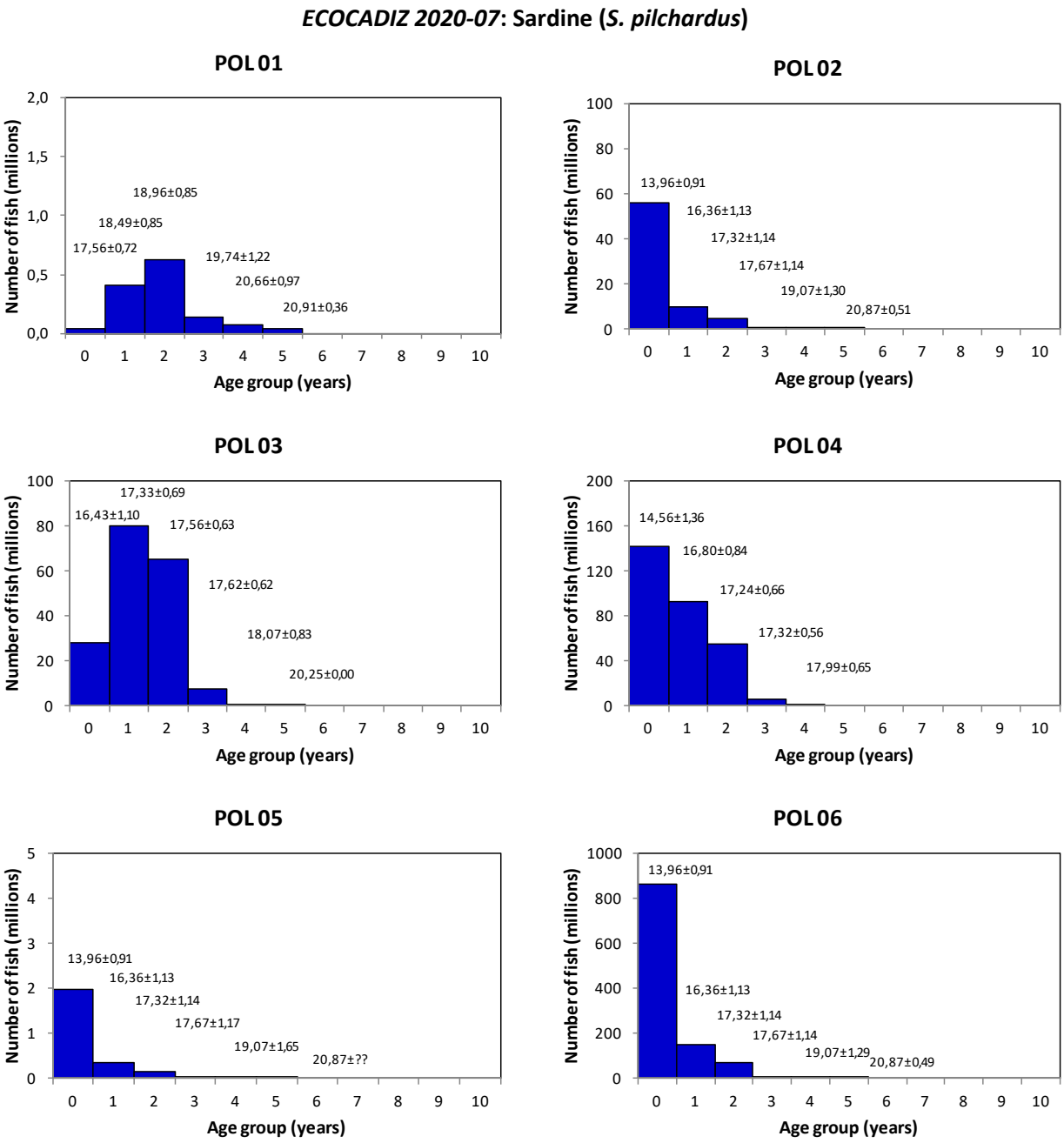



**Figure 23.** *ECOCADIZ 2020-07* survey. Sardine (*S. pilchardus*). Estimated abundances (number of fish in millions) by age group (years) by homogeneous stratum (POL01-POLn, numeration as in **Figure 21**) and total sampled area. Post-strata ordered in the W-E direction. Mean (±SD) sizes of age groups are also shown. The estimated biomass (t) by age group for the whole sampled area is shown for comparison. Note the different scales in the y axis.

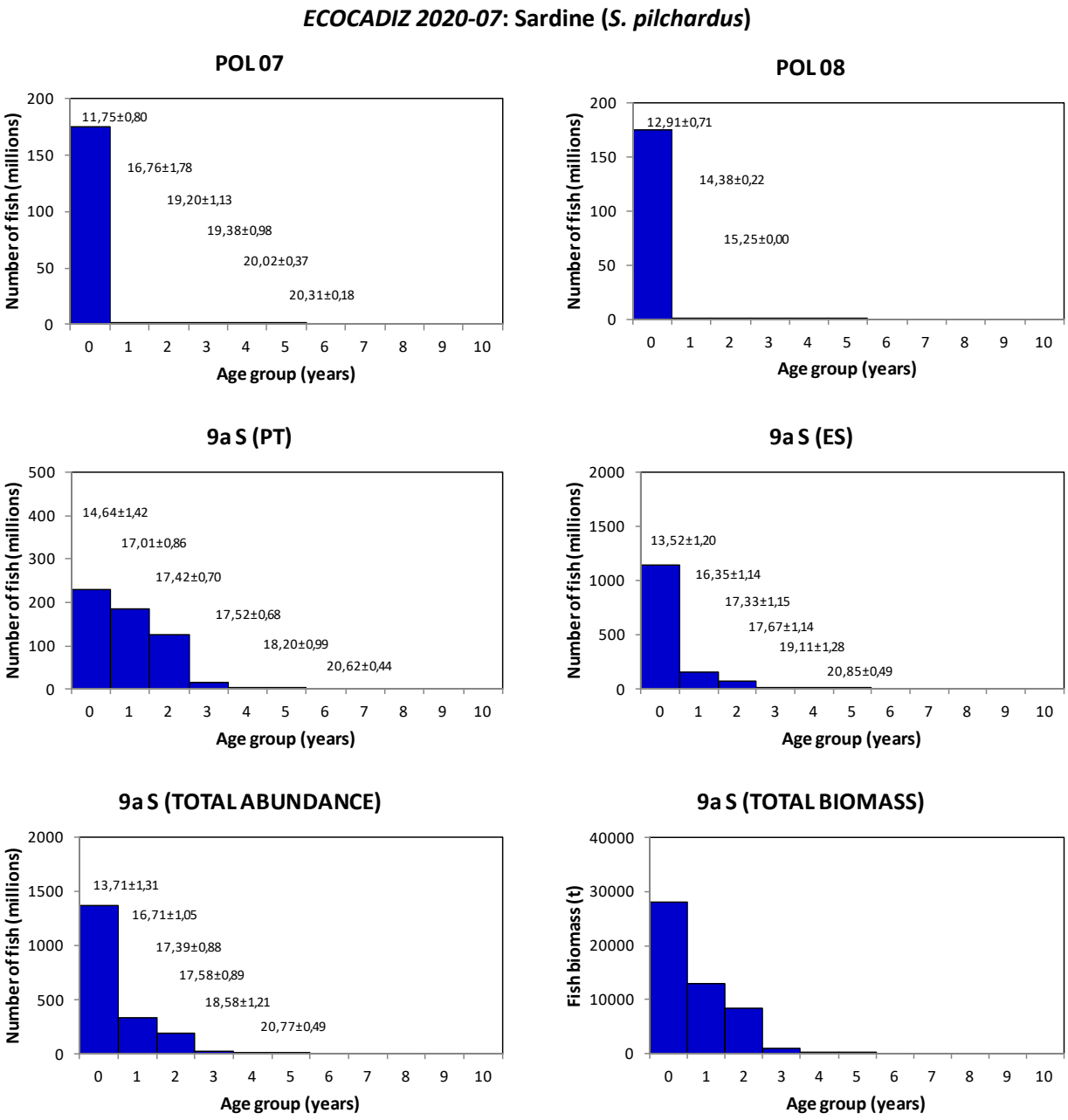



**Figure 23.** *ECOCADIZ 2020-07* survey. Sardine (*S. pilchardus*). Cont'd.

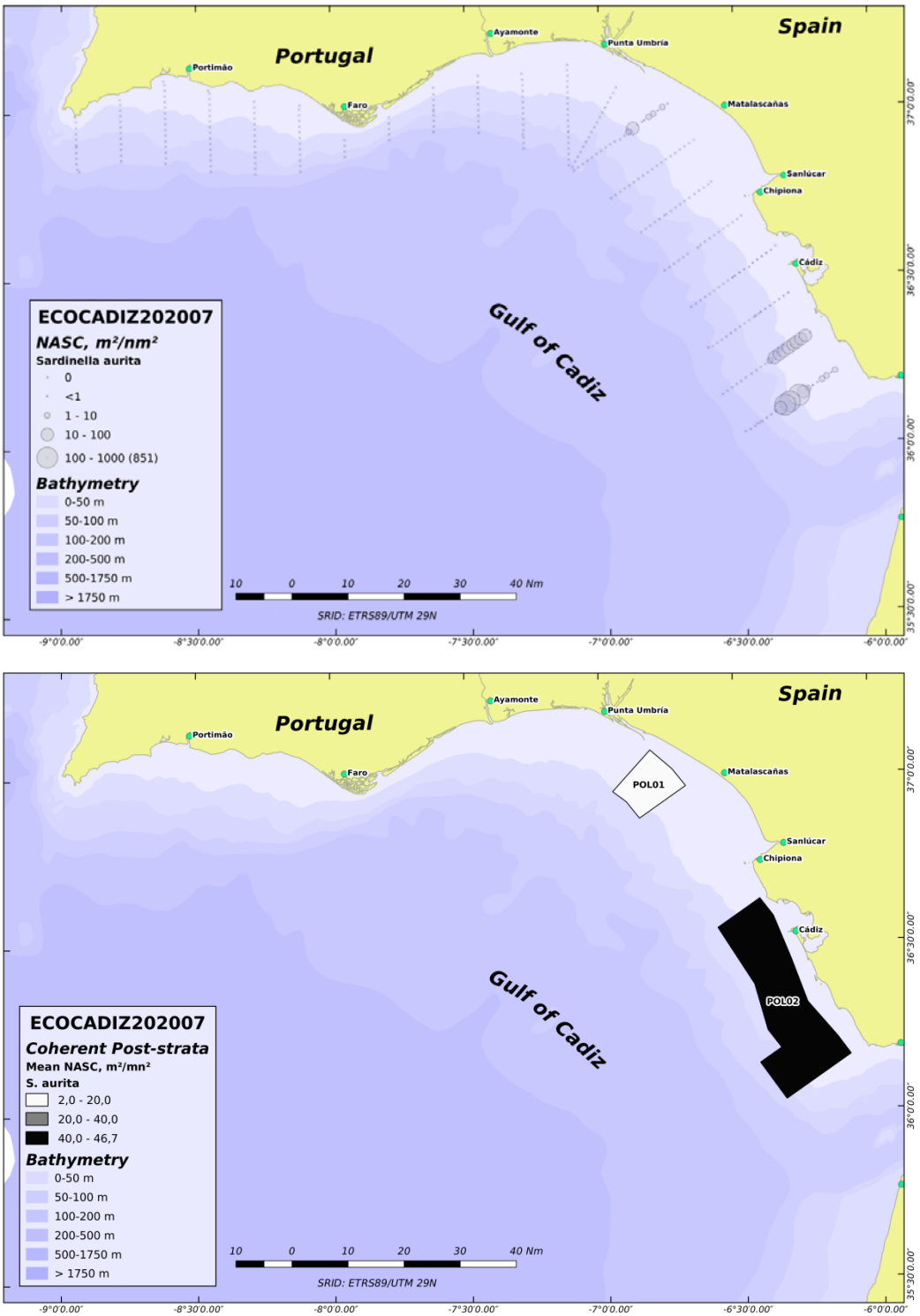



**Figure 24.** *ECOCADIZ 2020-07* survey. Round sardinella (*Sardinella aurita*). Top: distribution of the total backscattering energy (Nautical area scattering coefficient, *NASC*, in $m^2$ $nmi^{-2}$) attributed to the species. Bottom: distribution of homogeneous size-based post-strata used in the biomass/abundance estimates. Colour scale according to the mean value of the backscattering energy attributed to the species in each stratum.

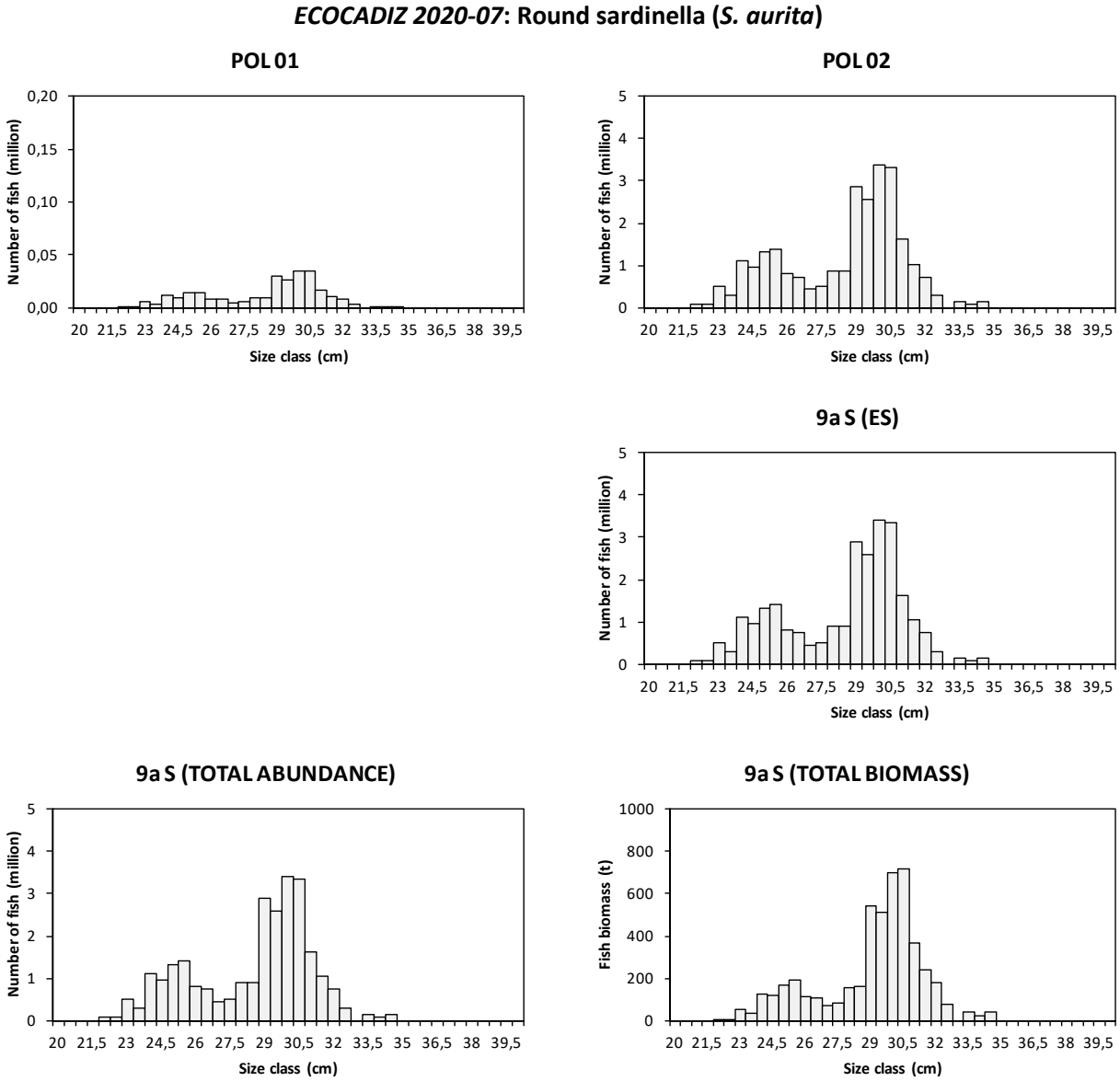



**Figure 25.** *ECOCADIZ 2020-07* survey. Round sardinella (*Sardinella aurita*). Estimated abundances (number of fish in millions) by length class (cm) by homogeneous stratum (POL01-POLn, numeration as in **Figure 24**) and total sampled area. Post-strata ordered in the W-E direction. The estimated biomass (t) by size class for the whole sampled area is also shown for comparison. Note the different scales in the y axis.

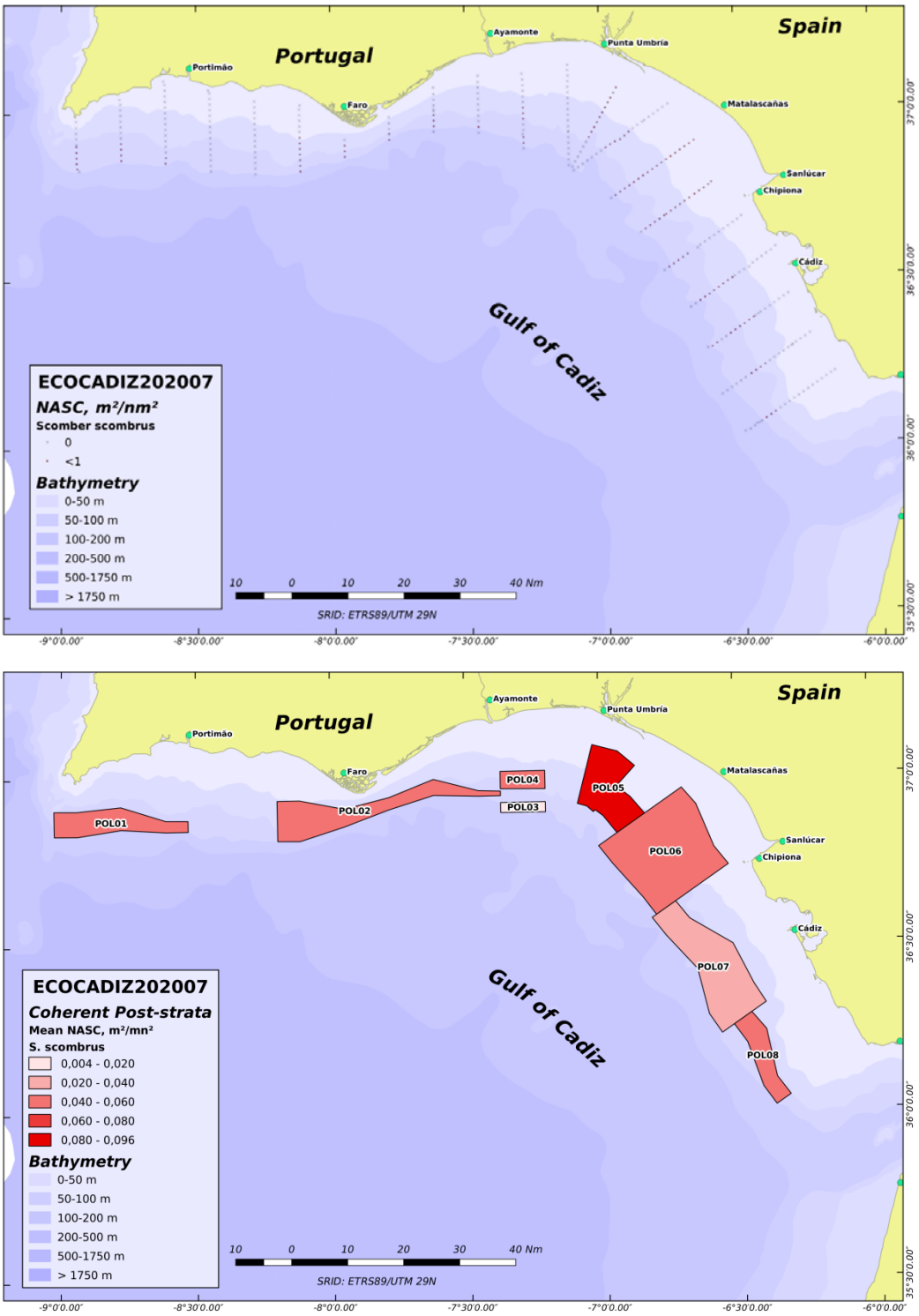



**Figure 26.** *ECOCADIZ 2020-07* survey. Mackerel (*Scomber scombrus*). Top: distribution of the total backscattering energy (Nautical area scattering coefficient, *NASC,* in $m^2$ $nmi^{-2}$) attributed to the species. Bottom: distribution of homogeneous size-based post-strata used in the biomass/abundance estimates. Colour scale according to the mean value of the backscattering energy attributed to the species in each stratum.

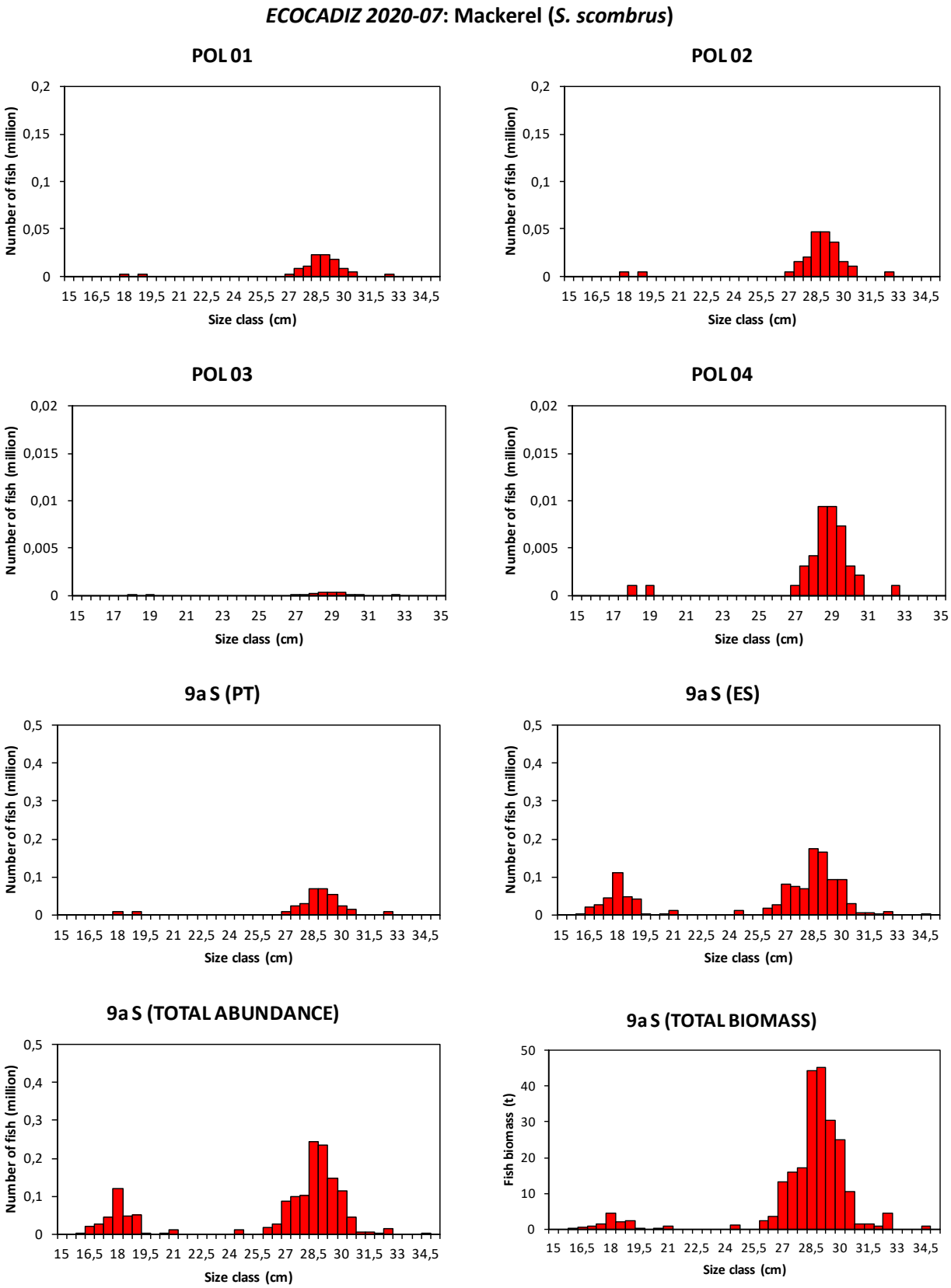



**Figure 27.** *ECOCADIZ 2020-07* survey. Mackerel (*Scomber scombrus*). Estimated abundances (number of fish in millions) by length class (cm) by homogeneous stratum (POL01-POLn, numeration as in **Figure 26**) and total sampled area. Post-strata ordered in the W-E direction. The estimated biomass (t) by size class for the whole sampled area is also shown for comparison. Note the different scales in the y axis.

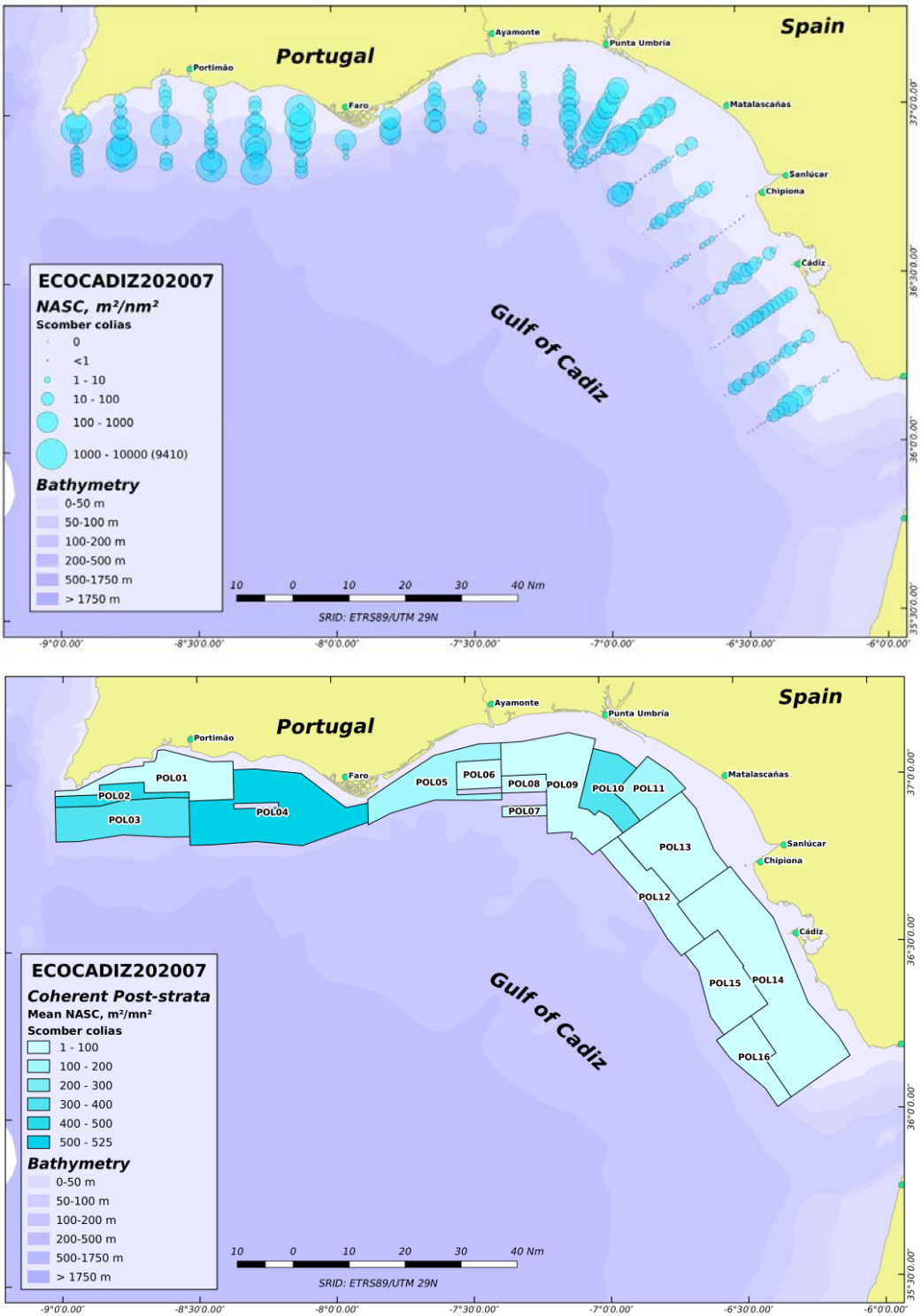



**Figure 28.** *ECOCADIZ 2020-07* survey. Chub mackerel (*Scomber colias*). Top: distribution of the total backscattering energy (Nautical area scattering coefficient, *NASC*, in $m^2$ $nmi^{-2}$) attributed to the species. Bottom: distribution of homogeneous size-based post-strata used in the biomass/abundance estimates. Colour scale according to the mean value of the backscattering energy attributed to the species in each stratum.

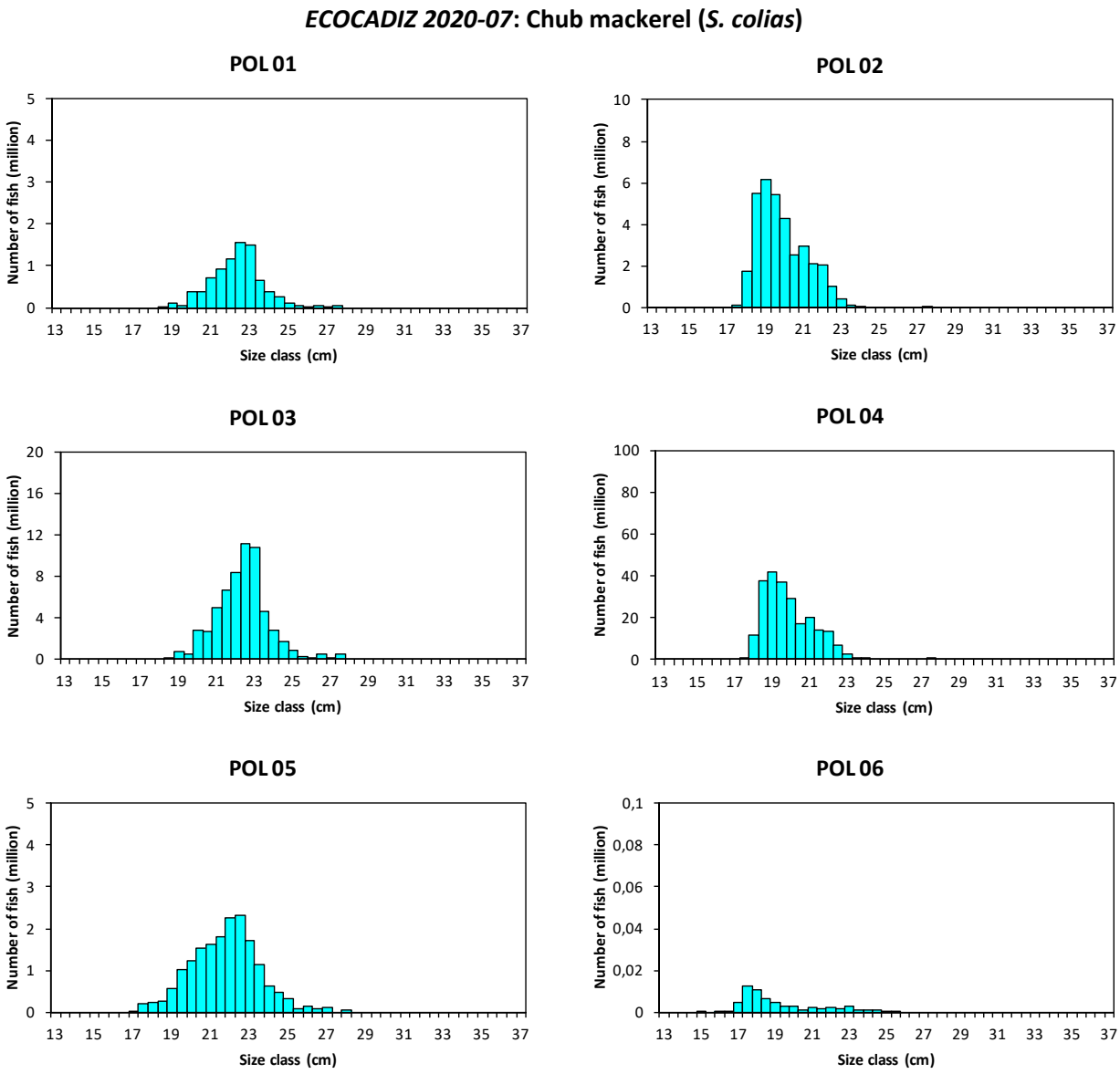



**Figure 29.** *ECOCADIZ 2020-07* survey. Chub mackerel (*Scomber colias*). Estimated abundances (number of fish in millions) by length class (cm) by homogeneous stratum (POL01-POLn, numeration as in **Figure 28**) and total sampled area. Post-strata ordered in the W-E direction. The estimated biomass (t) by size class for the whole sampled area is also shown for comparison. Note the different scales in the y axis.

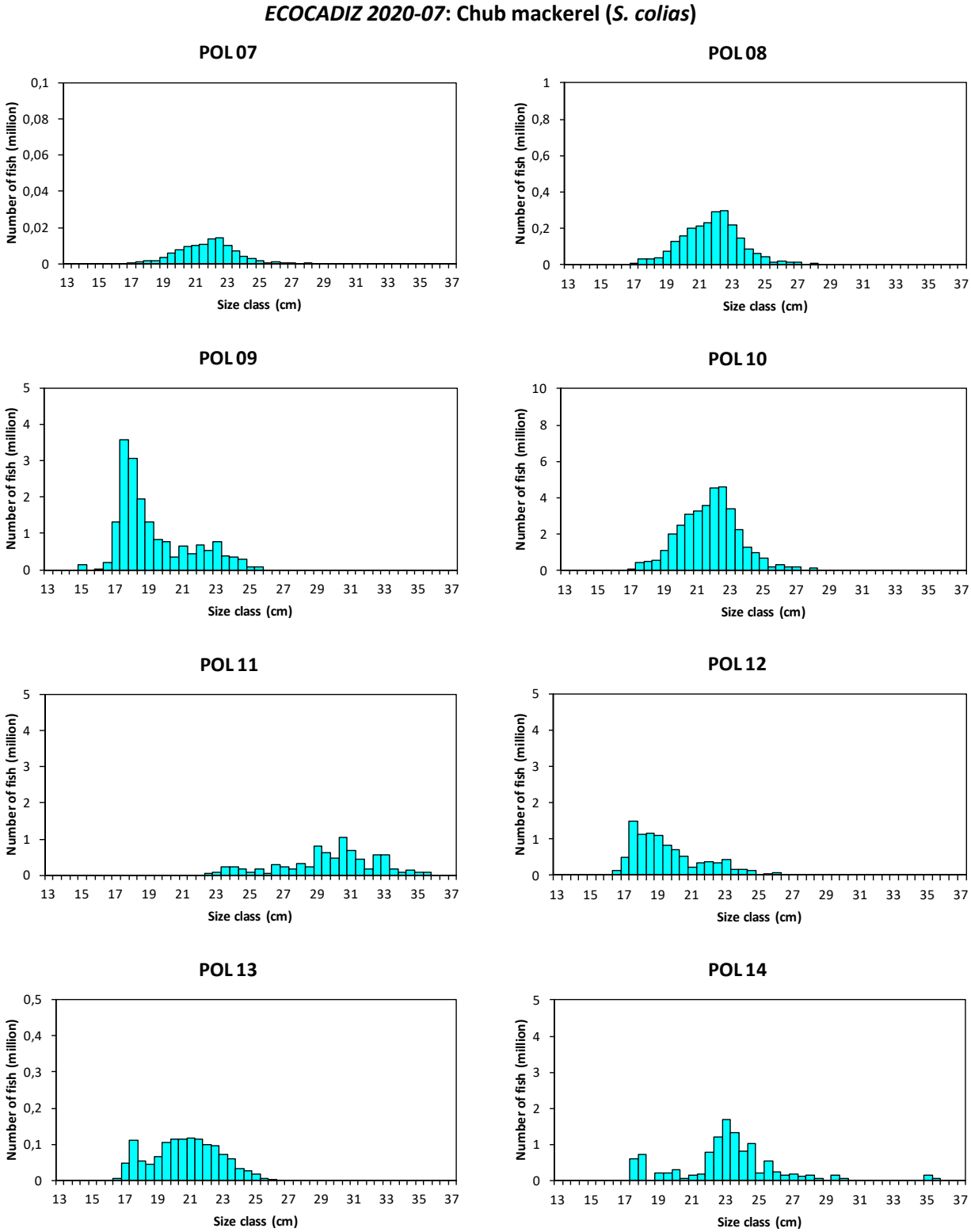



**Figure 29.** *ECOCADIZ 2020-07* survey. Chub mackerel (*Scomber colias*). Cont'd.

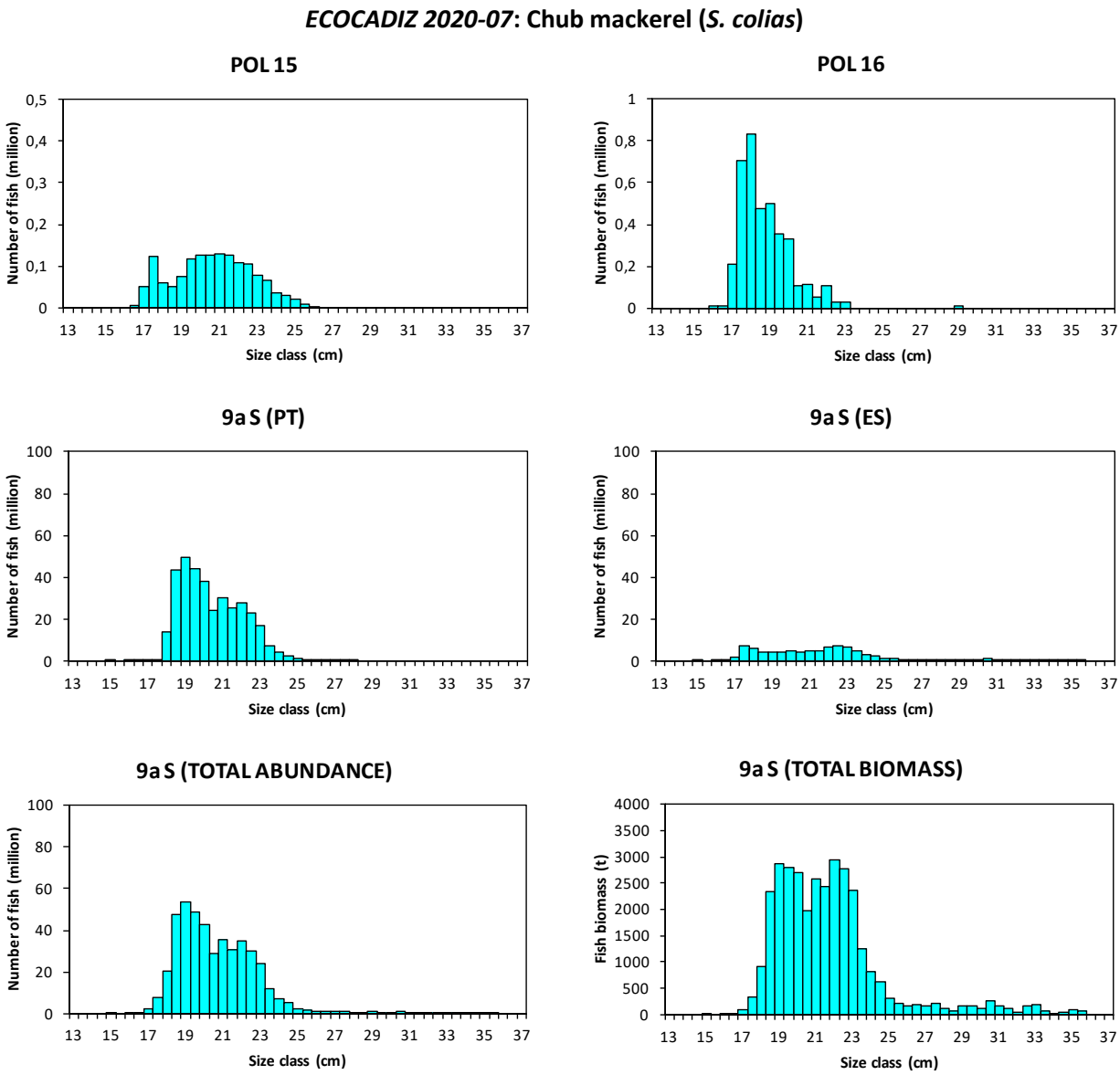



**Figure 29.** *ECOCADIZ 2020-07* survey. Chub mackerel (*Scomber colias*). Cont'd.

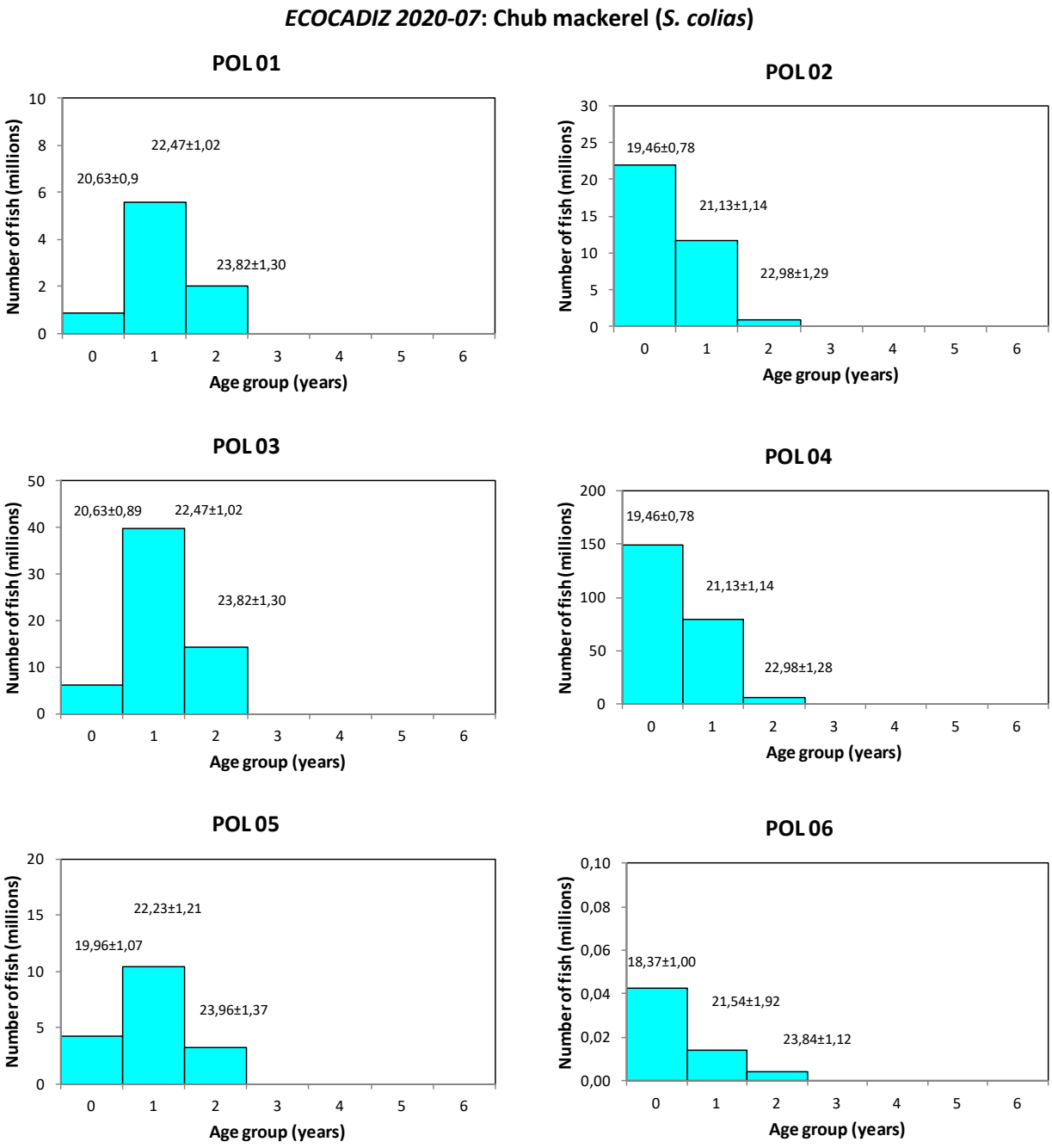



**Figure 30.** *ECOCADIZ 2020-07* survey. Chub mackerel (*Scomber colias*). Estimated abundances (number of fish in millions) by age group (years) by homogeneous stratum (POL01-POLn, numeration as in **Figure 28**) and total sampled area. Post-strata ordered in the W-E direction. Mean (±SD) sizes of age groups are also shown. The estimated biomass (t) by age group for the whole sampled area is shown for comparison. Note the different scales in the y axis.

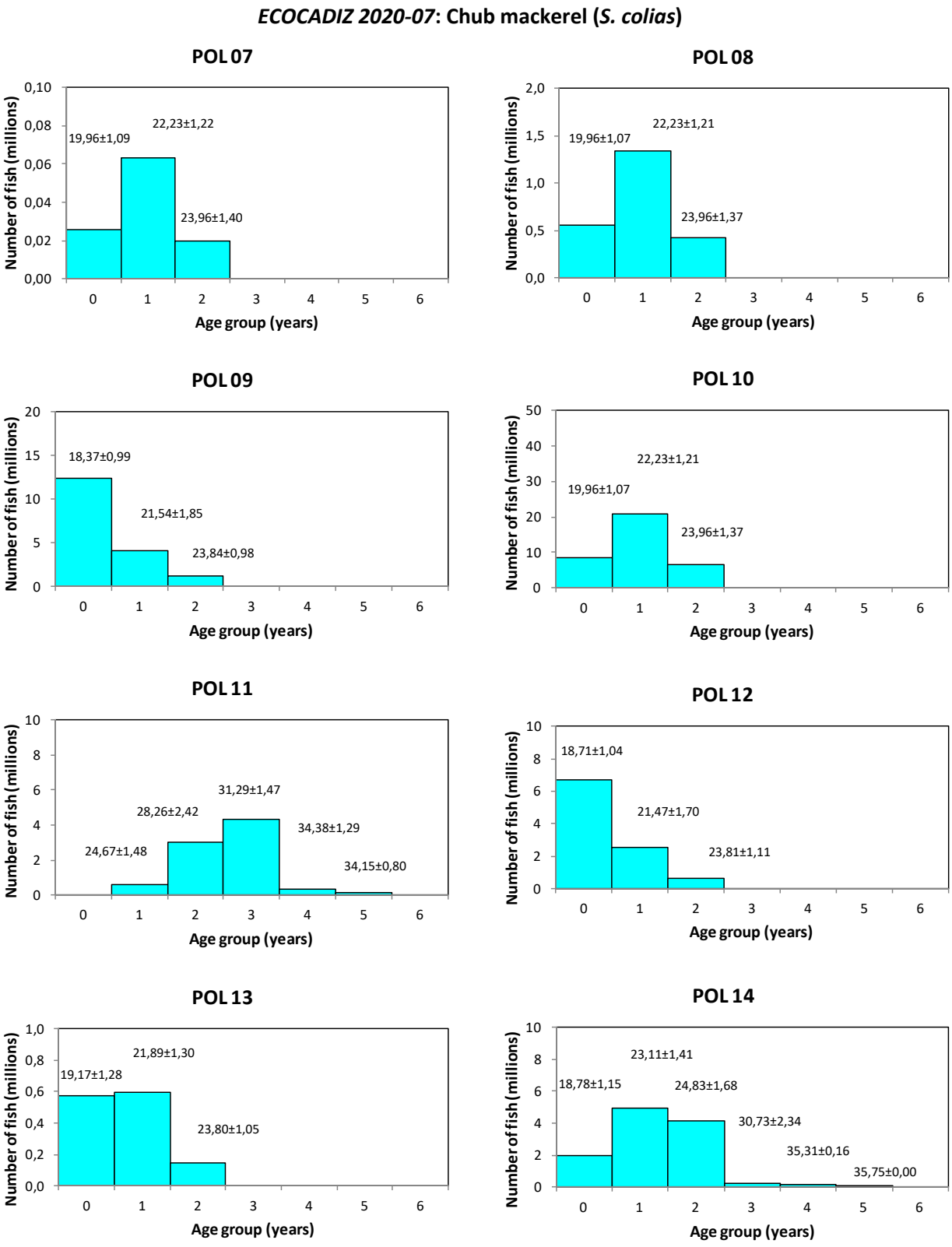



**Figure 30.** *ECOCADIZ 2020-07* survey. Chub mackerel (*Scomber colias*). Cont'd.

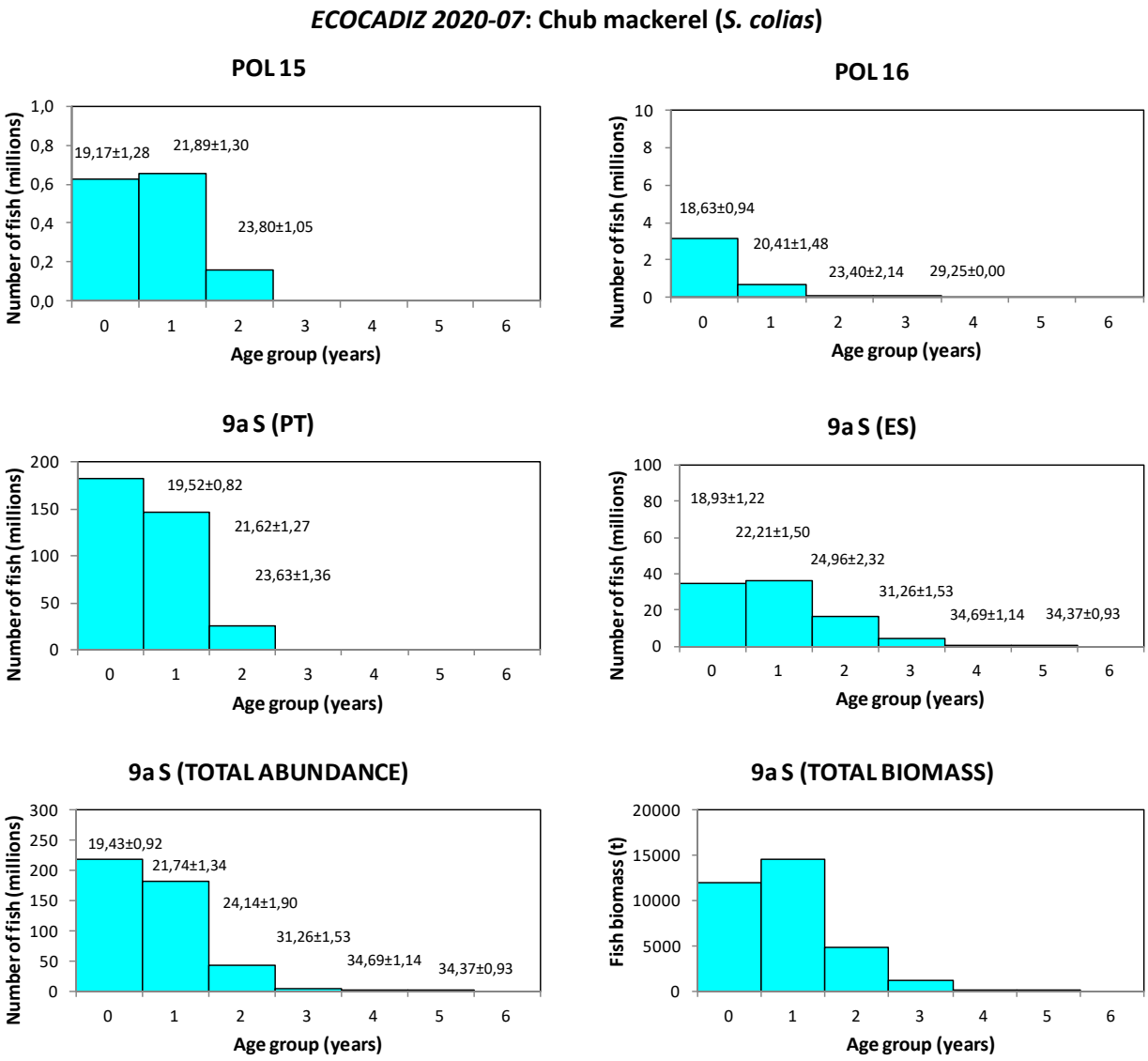



**Figure 30.** *ECOCADIZ 2020-07* survey. Chub mackerel (*Scomber colias*). Cont'd.

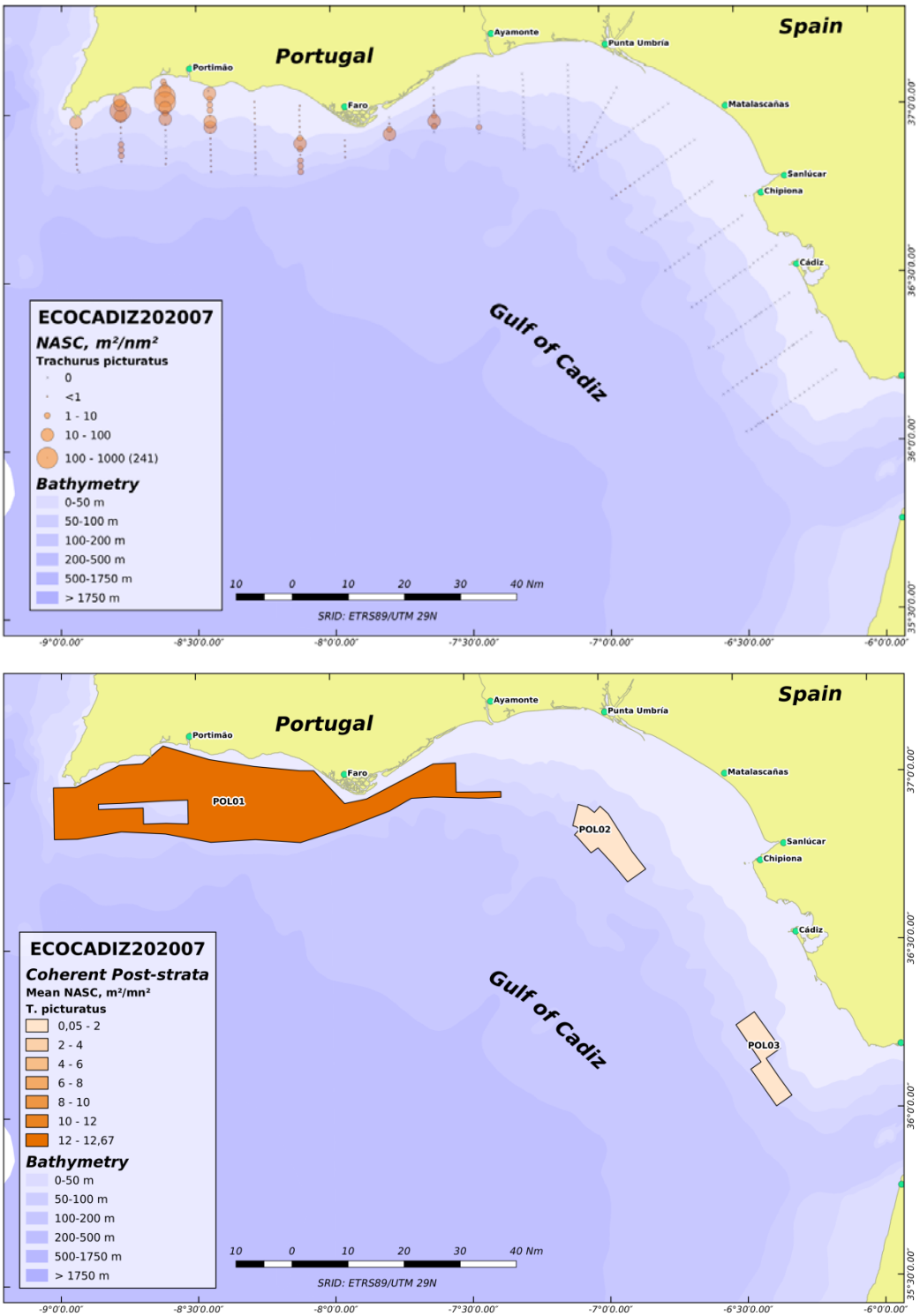



**Figure 31.** *ECOCADIZ 2020-07* survey. Blue jack mackerel (*Trachurus picturatus*). Top: distribution of the total backscattering energy (Nautical area scattering coefficient, *NASC*, in $m^2$ $nmi^{-2}$) attributed to the species. Bottom: distribution of homogeneous size-based post-strata used in the biomass/abundance estimates. Colour scale according to the mean value of the backscattering energy attributed to the species in each stratum.

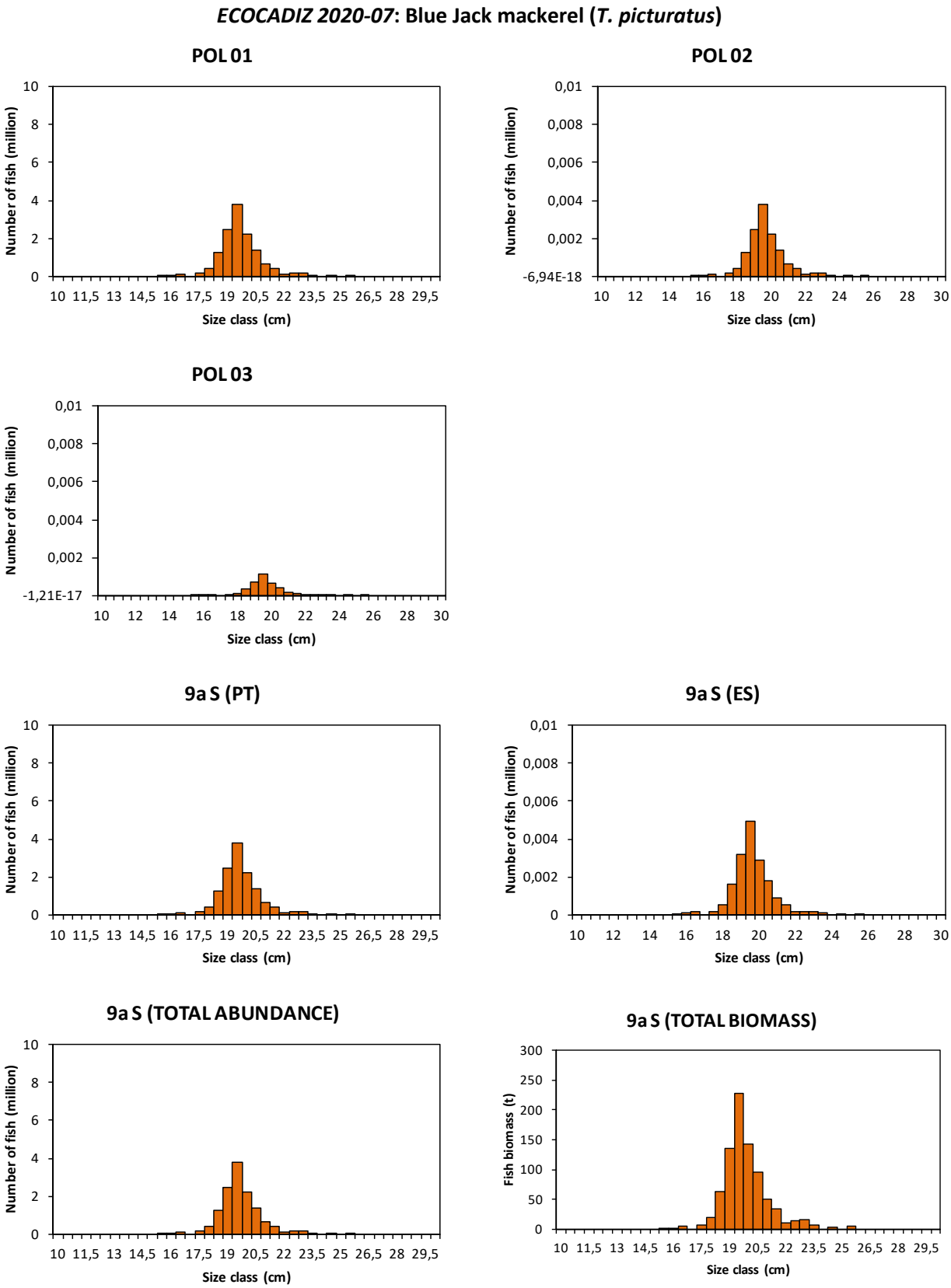



**Figure 32.** *ECOCADIZ 2020-07* survey. Blue jack mackerel (*Trachurus picturatus*). Estimated abundances (number of fish in millions) by length class (cm) by homogeneous stratum (POL01-POLn, numeration as in **Figure 31**) and total sampled area. Post-strata ordered in the W-E direction. The estimated biomass (t) by size class for the whole sampled area is also shown for comparison. Note the different scales in the y axis.

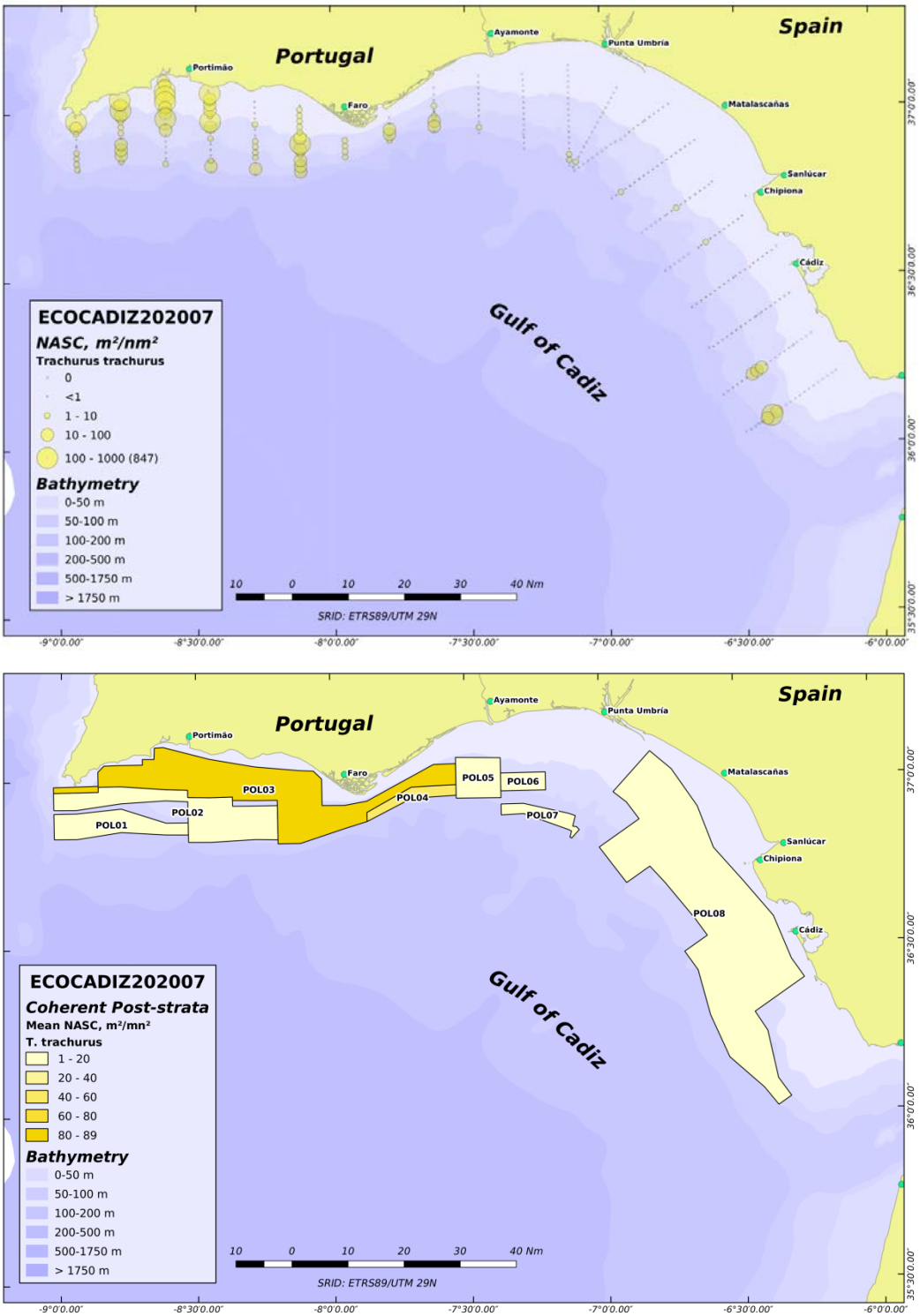



**Figure 33.** *ECOCADIZ 2020-07* survey. Horse mackerel (*Trachurus trachurus*). Top: distribution of the total backscattering energy (Nautical area scattering coefficient, *NASC*, in $m^2$ $nmi^{-2}$) attributed to the species. Bottom: distribution of homogeneous size-based post-strata used in the biomass/abundance estimates. Colour scale according to the mean value of the backscattering energy attributed to the species in each stratum.

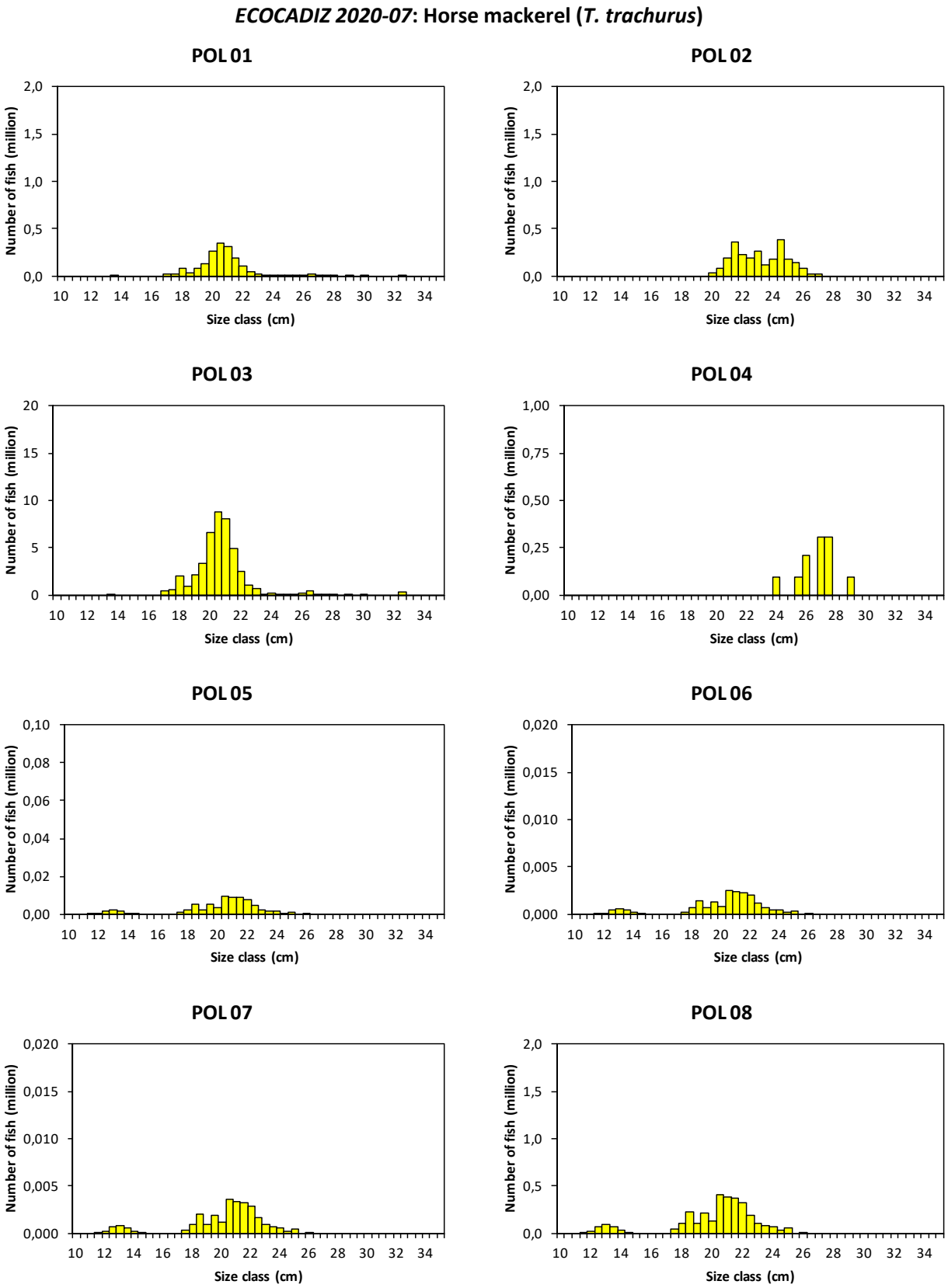



**Figure 34.** *ECOCADIZ 2020-07* survey. Horse mackerel (*Trachurus trachurus*). Estimated abundances (number of fish in millions) by length class (cm) by homogeneous stratum (POL01-POLn, numeration as in **Figure 33**) and total sampled area. Post-strata ordered in the W-E direction. The estimated biomass (t) by size class for the whole sampled area is also shown for comparison. Note the different scales in the y axis.

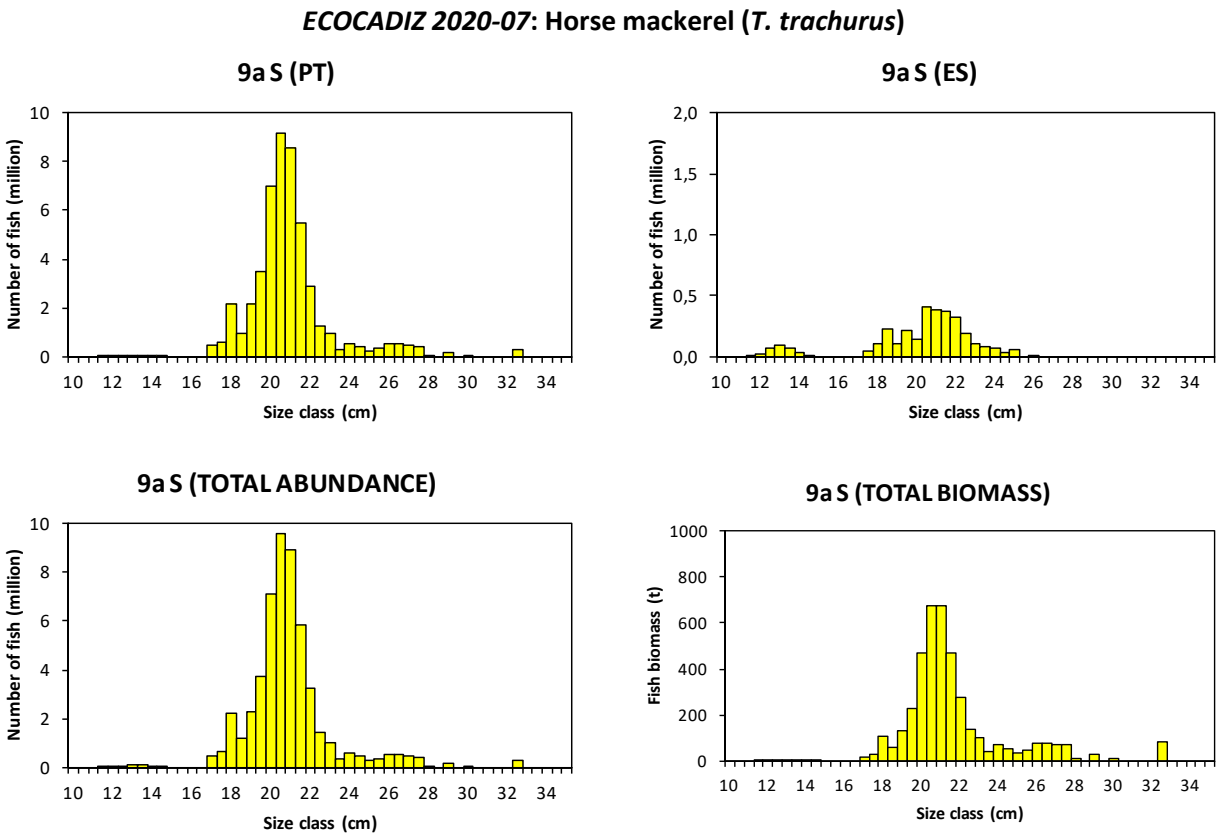



**Figure 34.** *ECOCADIZ 2020-07* survey. Horse mackerel (*Trachurus trachurus*).Cont'd.

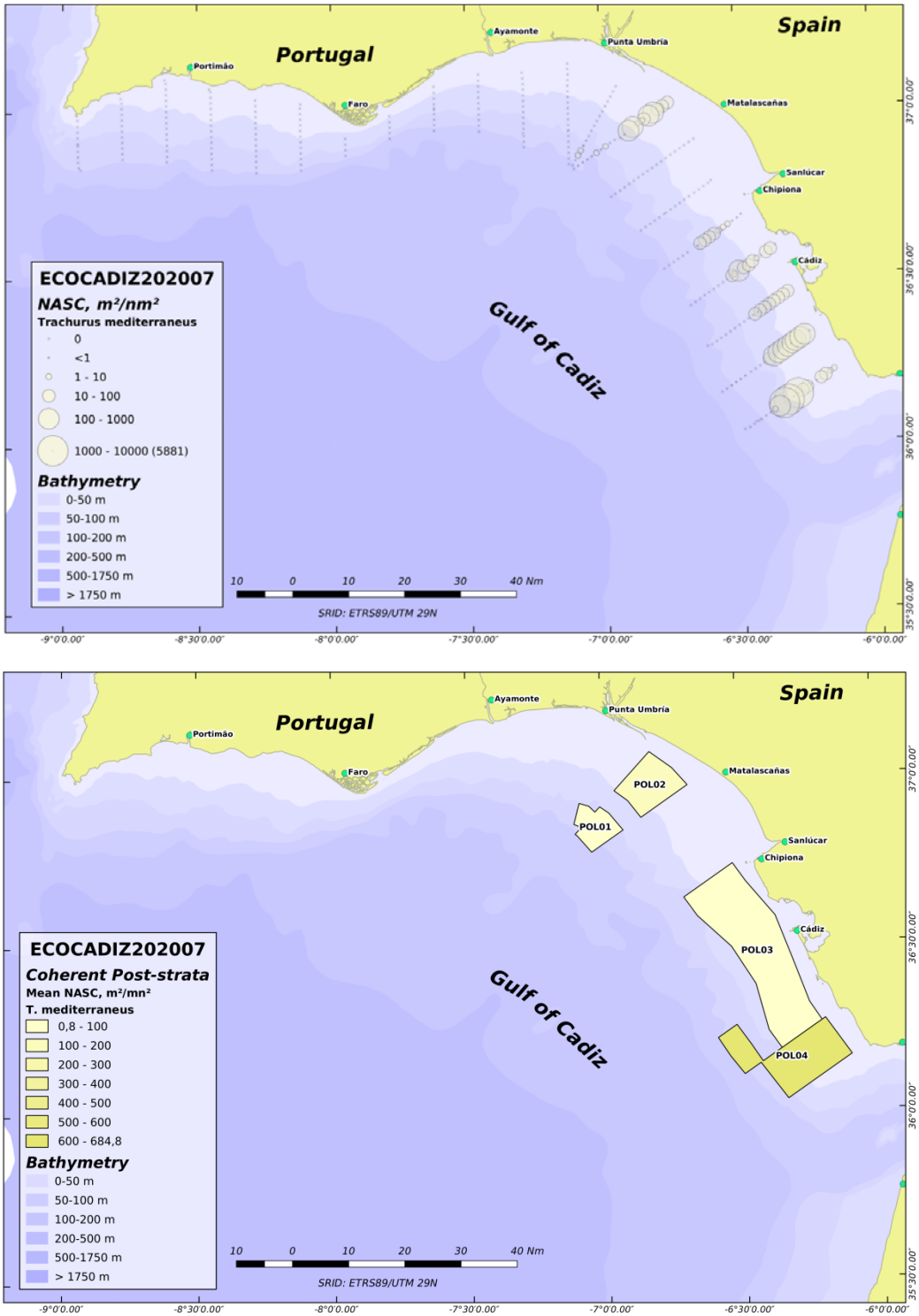



**Figure 35.** *ECOCADIZ 2020-07* survey. Mediterranean horse mackerel (*Trachurus mediterraneus*). Top: distribution of the total backscattering energy (Nautical area scattering coefficient, *NASC*, in $m^2$ $nmi^{-2}$) attributed to the species. Bottom: distribution of homogeneous size-based post-strata used in the biomass/abundance estimates. Colour scale according to the mean value of the backscattering energy attributed to the species in each stratum.

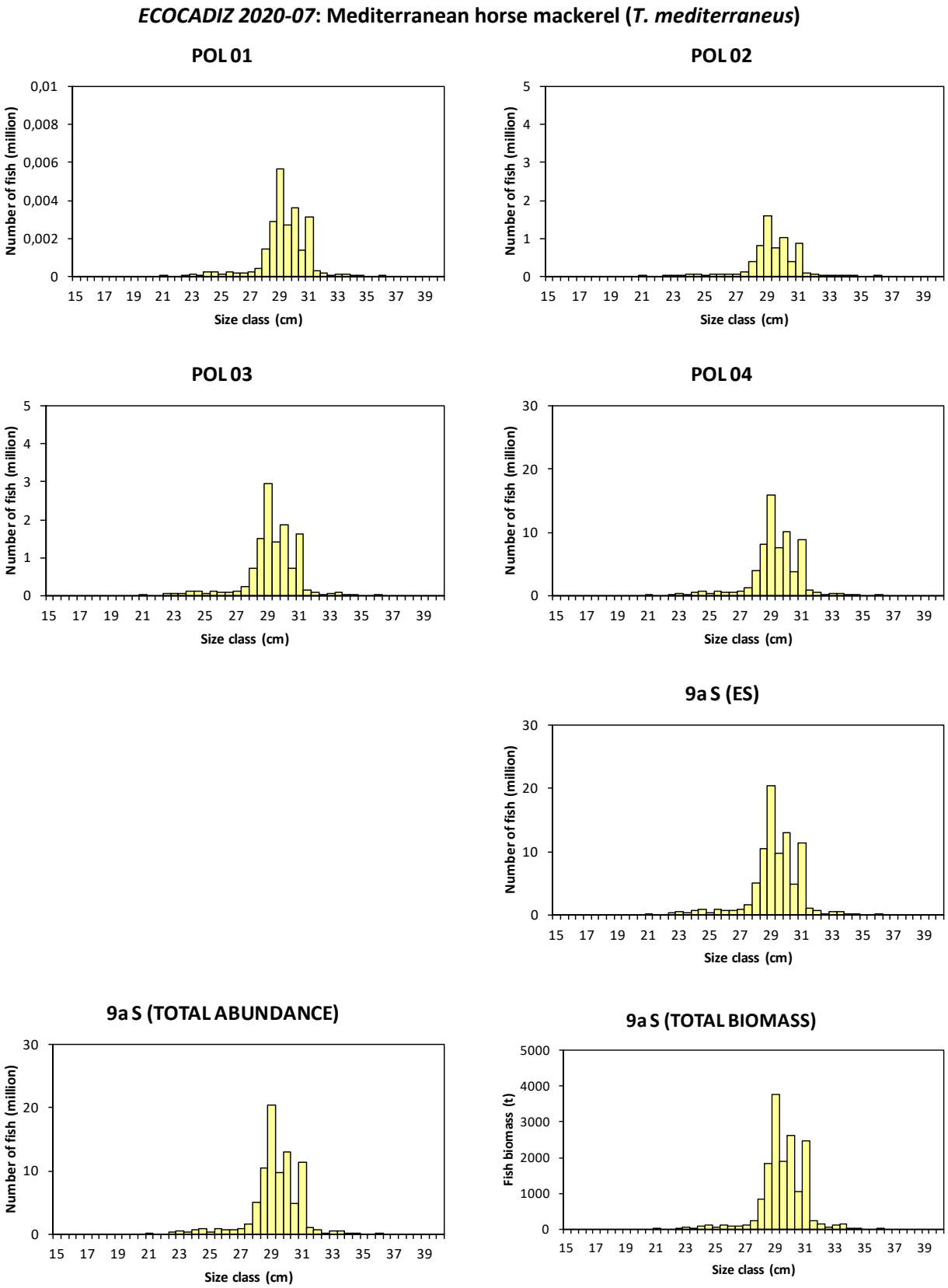



**Figure 36.** *ECOCADIZ 2020-07* survey. Mediterranean horse mackerel (*Trachurus mediterraneus*). Estimated abundances (number of fish in millions) by length class (cm) by homogeneous stratum (POL01-POLn, numeration as in **Figure 35**) and total sampled area. Post-strata ordered in the W-E direction. The estimated biomass (t) by size class for the whole sampled area is also shown for comparison. Note the different scales in the y axis.

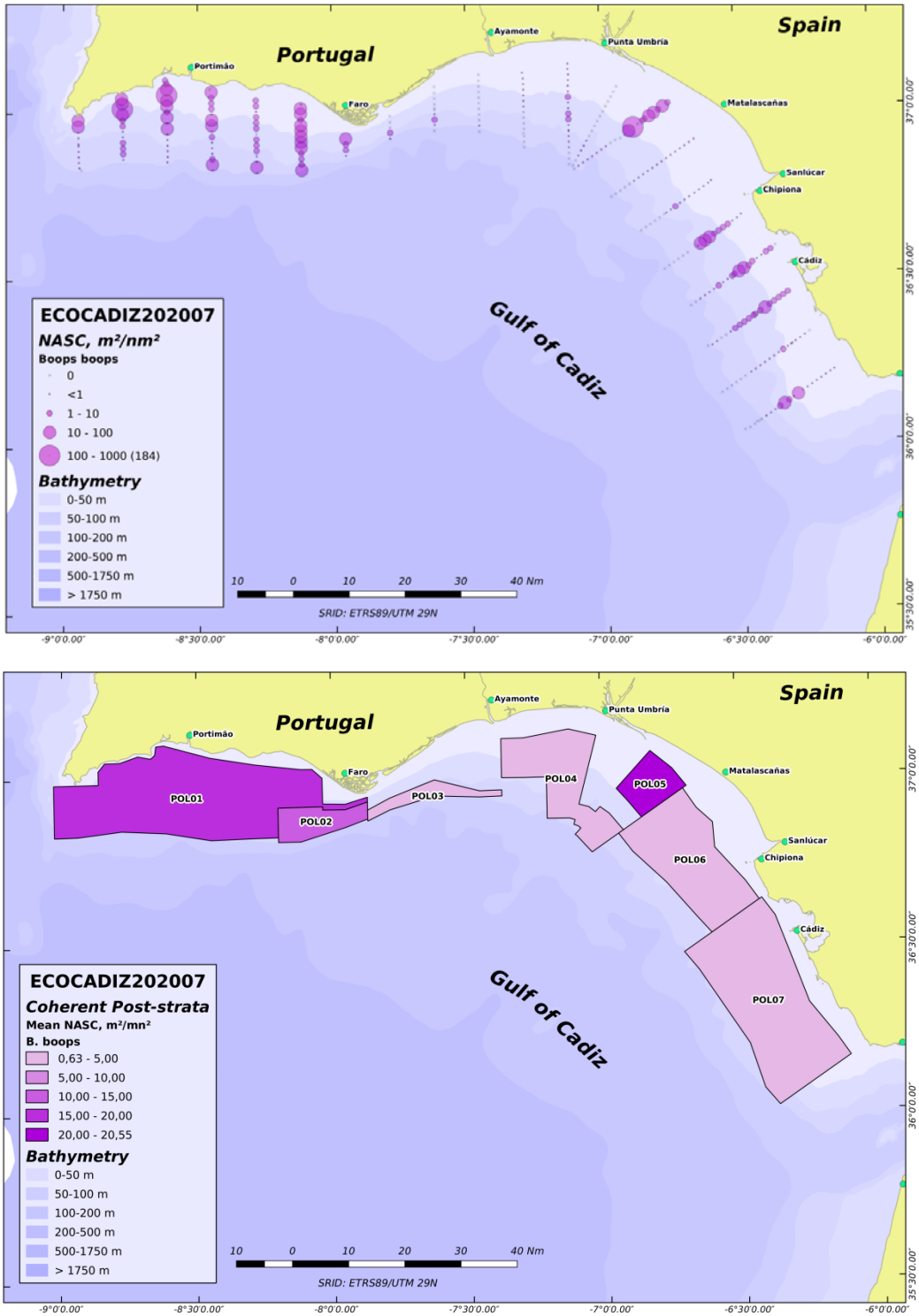



**Figure 37.** *ECOCADIZ 2020-07* survey. Bogue (*Boops boops*). Top: distribution of the total backscattering energy (Nautical area scattering coefficient, *NASC*, in $m^2$ $nmi^{-2}$) attributed to the species. Bottom: distribution of homogeneous size-based post-strata used in the biomass/abundance estimates. Colour scale according to the mean value of the backscattering energy attributed to the species in each stratum.

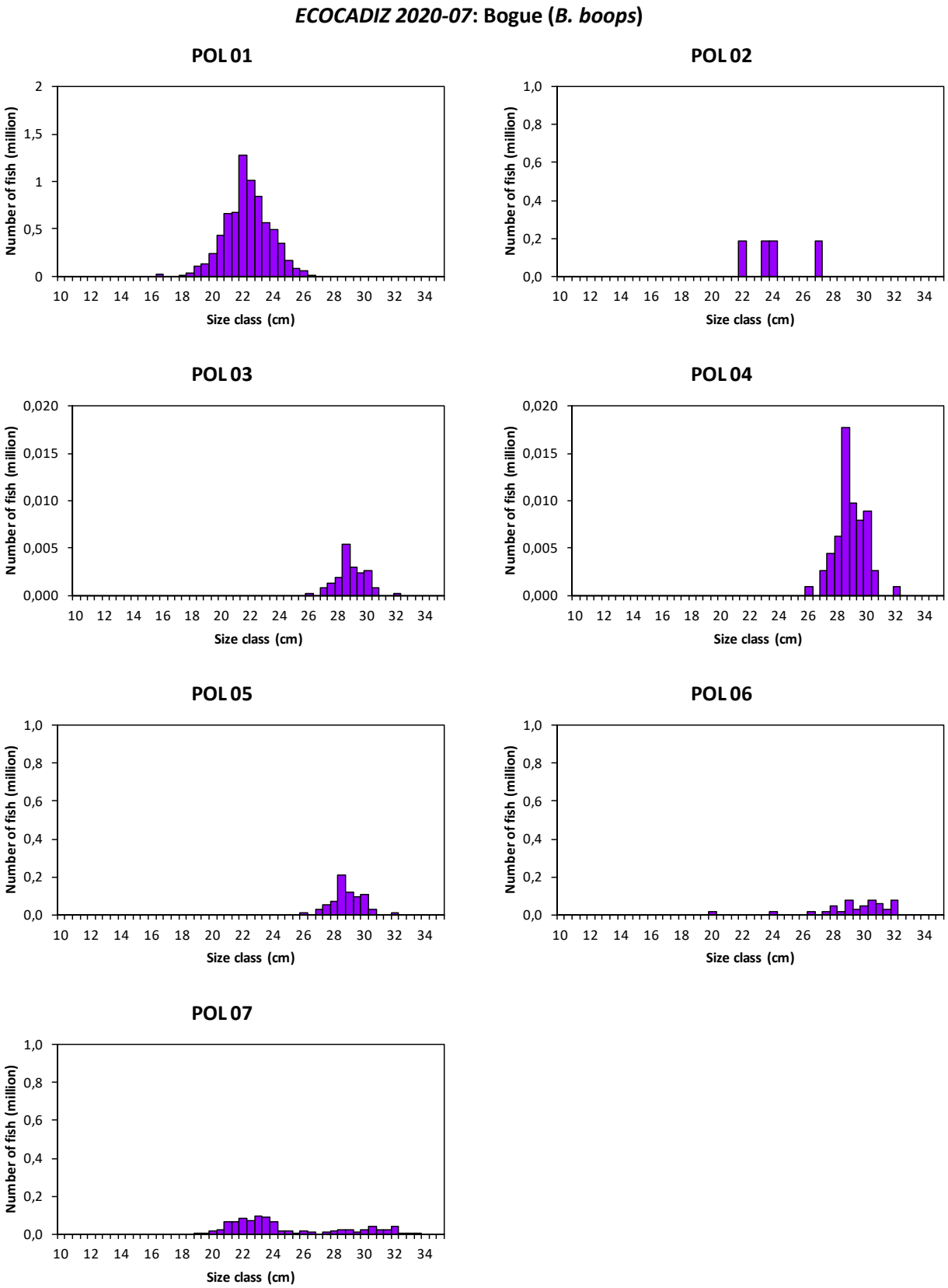



**Figure 38.** *ECOCADIZ 2020-07* survey. Bogue (*Boops boops*). Estimated abundances (number of fish in millions) by length class (cm) by homogeneous stratum (POL01-POLn, numeration as in **Figure 37**) and total sampled area. Post-strata ordered in the W-E direction. The estimated biomass (t) by size class for the whole sampled area is also shown for comparison. Note the different scales in the y axis.

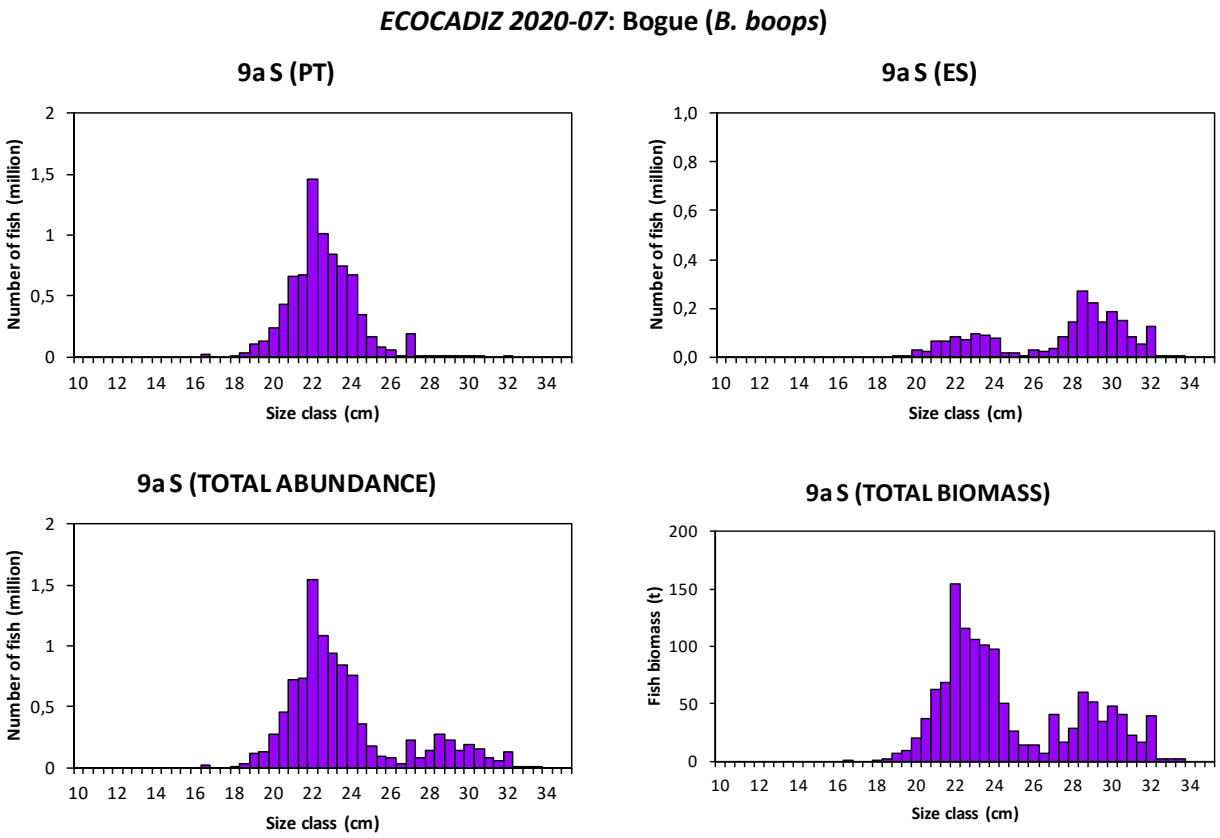



**Figure 38.** *ECOCADIZ 2020-07* survey. Bogue (*Boops boops*). Cont´d.

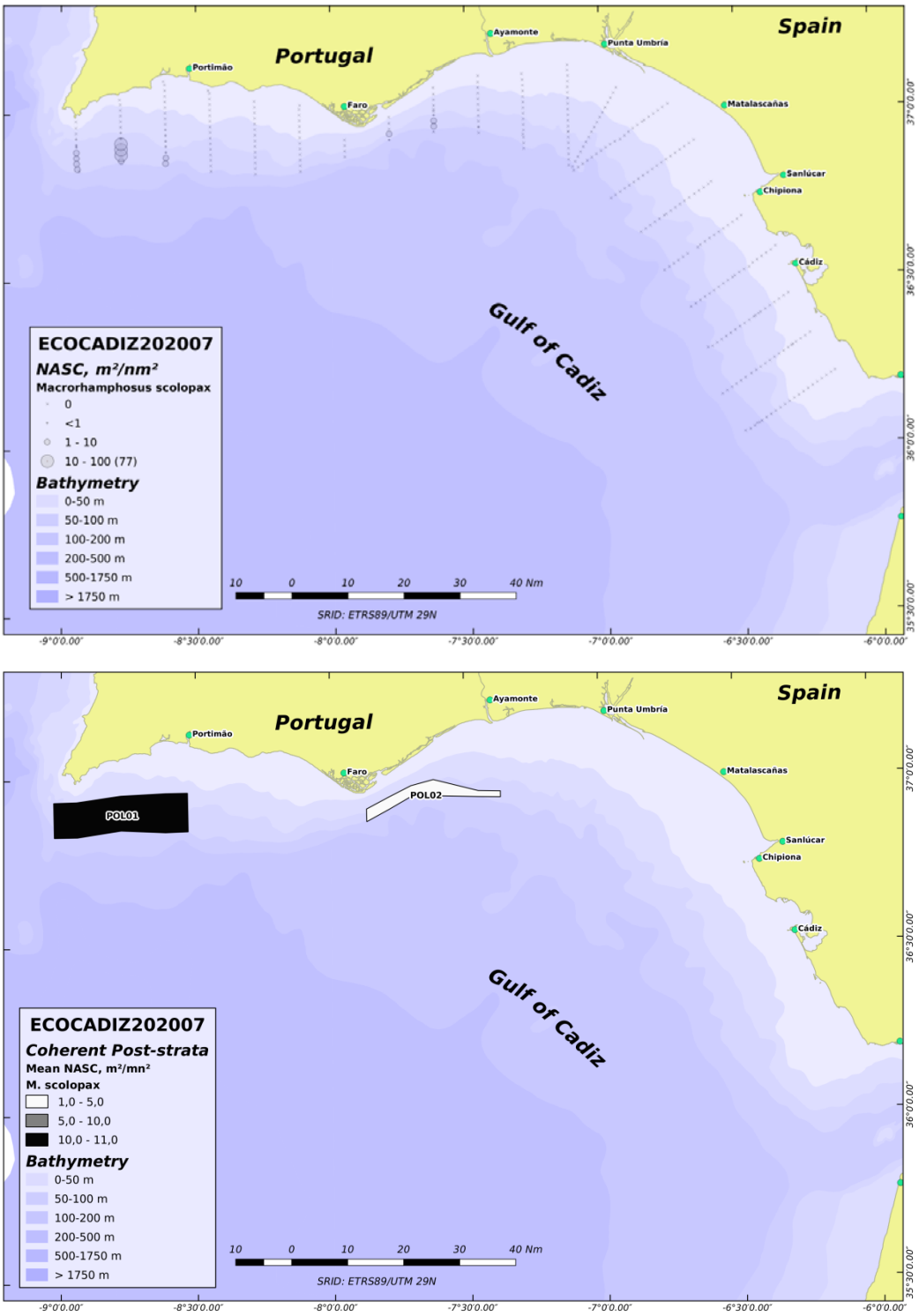



**Figure 39.** *ECOCADIZ 2020-07* survey. Longspine snipefish (*Macroramphosus scolopax*). Top: distribution of the total backscattering energy (Nautical area scattering coefficient, *NASC*, in $m^2$ $nmi^{-2}$) attributed to the species. Bottom: distribution of homogeneous size-based post-strata used in the biomass/abundance estimates. Colour scale according to the mean value of the backscattering energy attributed to the species in each stratum.

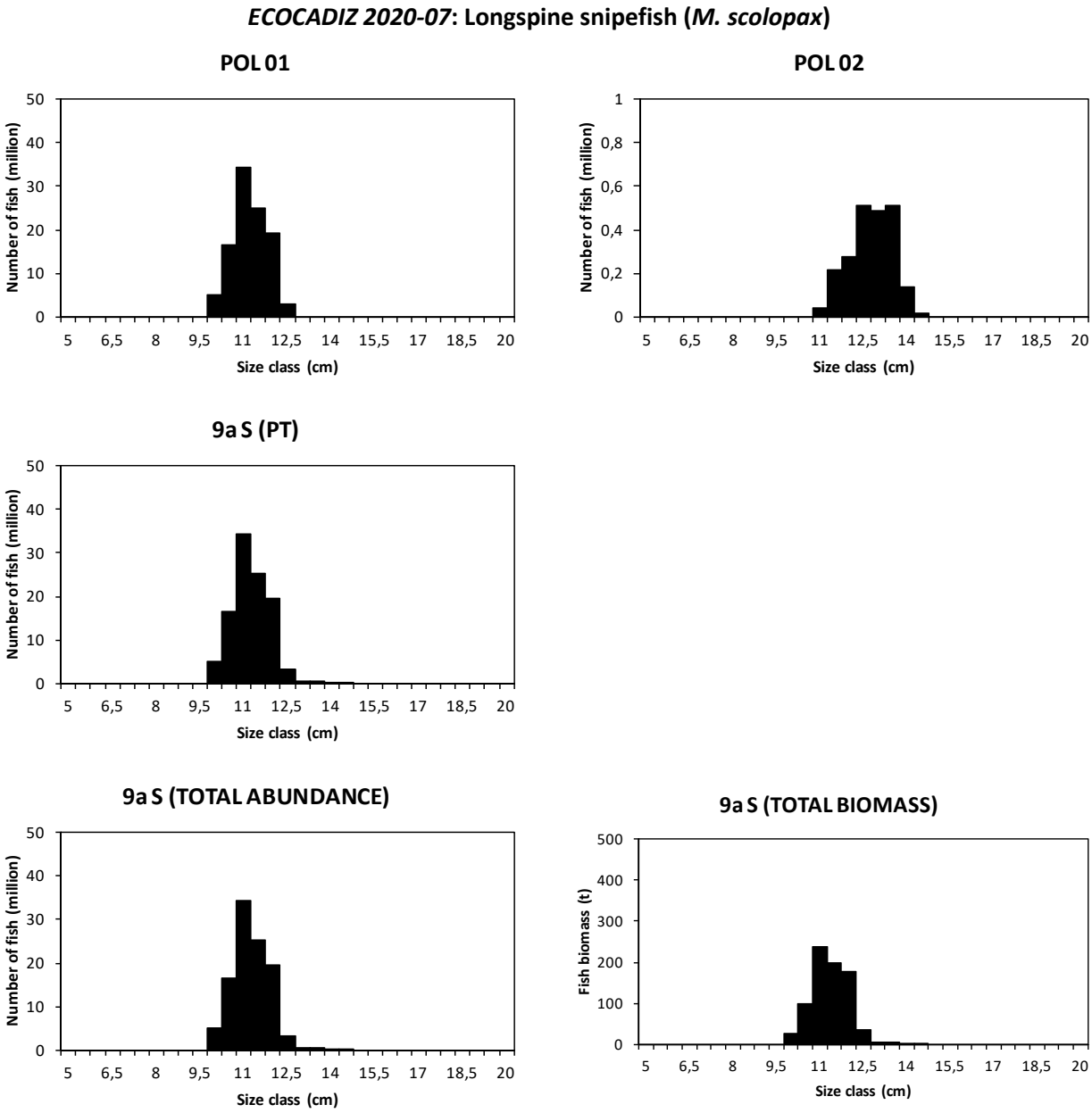



**Figure 40.** *ECOCADIZ 2020-07* survey. Longspine snipefish (*Macroramphosus scolopax*). Estimated abundances (number of fish in millions) by length class (cm) by homogeneous stratum (POL01-POLn, numeration as in **Figure 39**) and total sampled area. Post-strata ordered in the W-E direction. The estimated biomass (t) by size class for the whole sampled area is also shown for comparison. Note the different scales in the y axis.

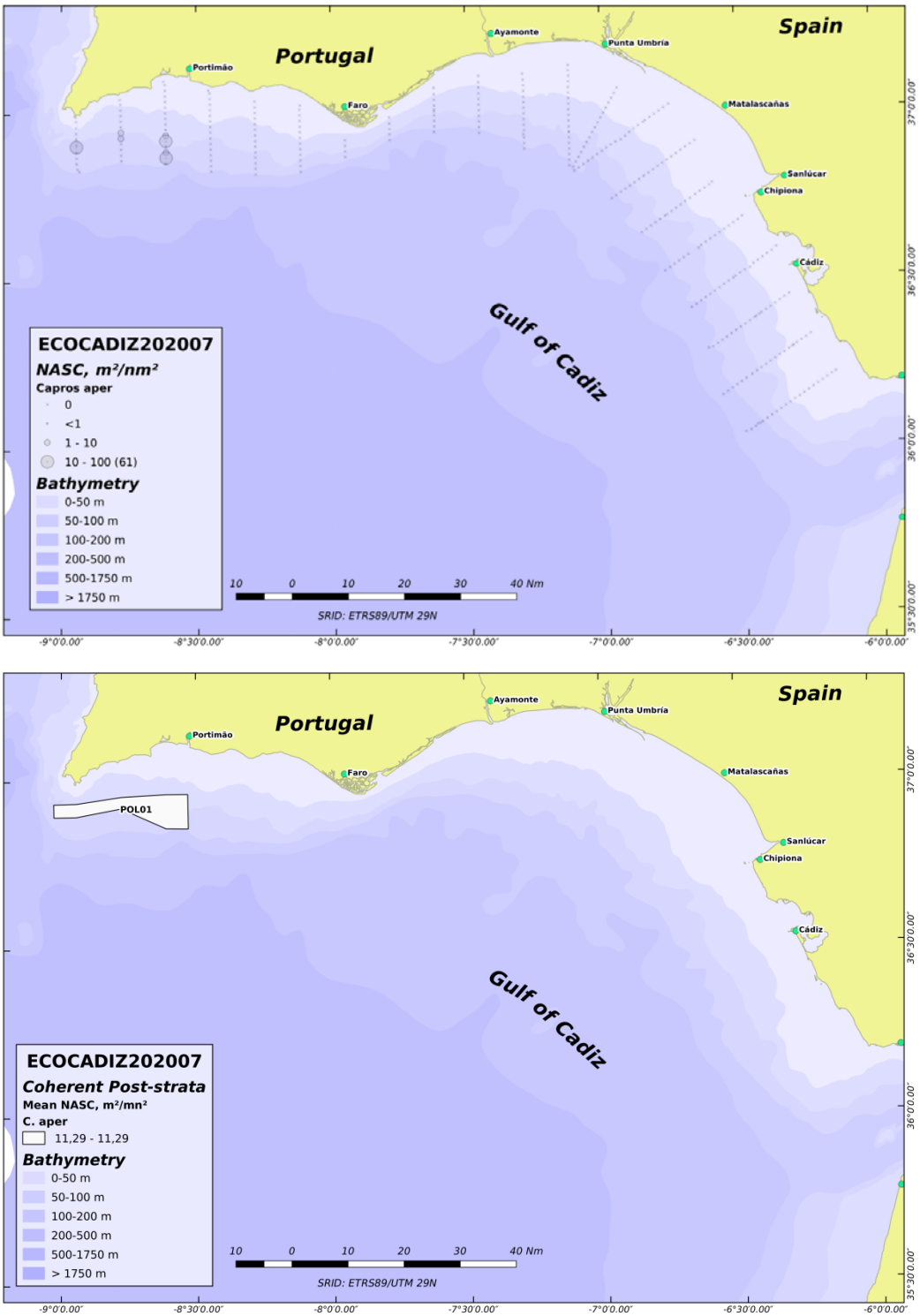



**Figure 41.** *ECOCADIZ 2020-07* survey. Boarfish (*Capros aper*). Top: distribution of the total backscattering energy (Nautical area scattering coefficient, *NASC,* in $m^2$ $nmi^{-2}$) attributed to the species. Bottom: distribution of homogeneous size-based post-strata used in the biomass/abundance estimates. Colour scale according to the mean value of the backscattering energy attributed to the species in each stratum.

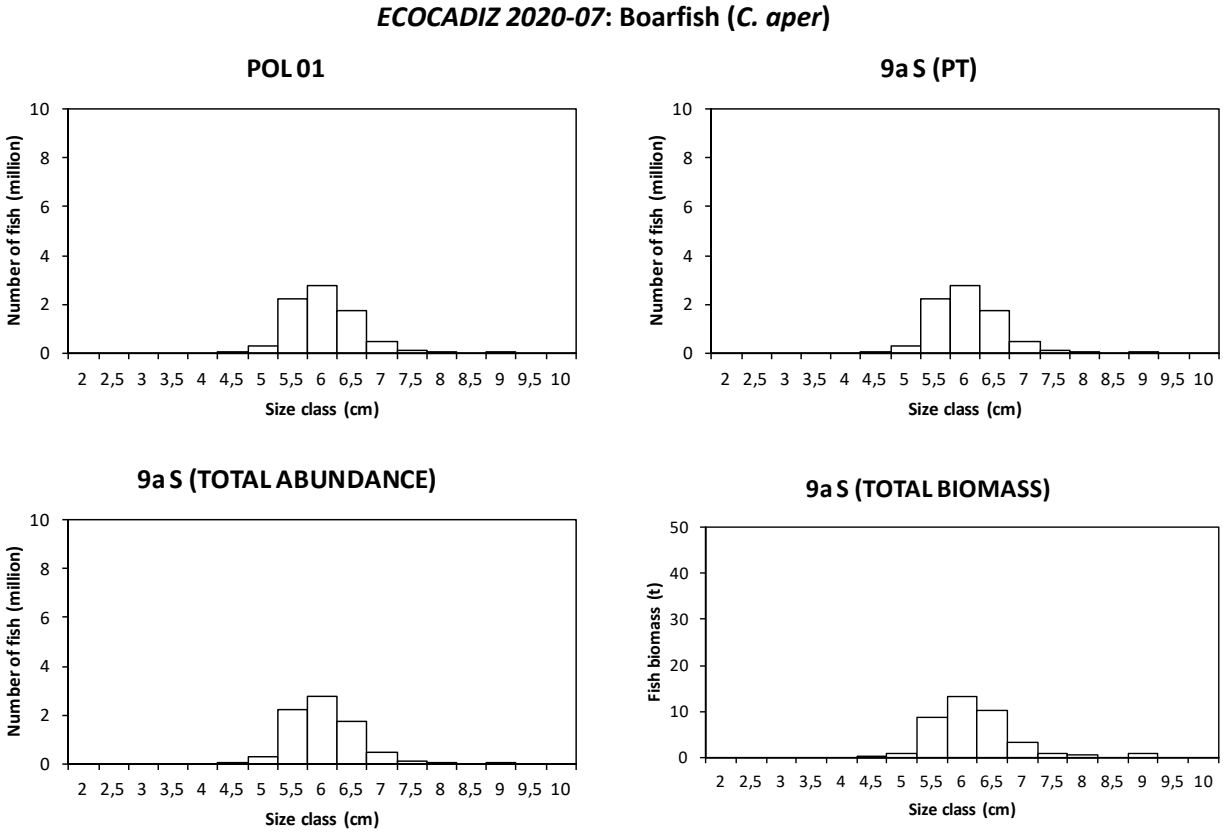



**Figure 42.** *ECOCADIZ 2020-07* survey. Boarfish (*Capros aper*). Estimated abundances (number of fish in millions) by length class (cm) by homogeneous stratum (POL01-POLn, numeration as in **Figure 41**) and total sampled area. Post-strata ordered in the W-E direction. The estimated biomass (t) by size class for the whole sampled area is also shown for comparison. Note the different scales in the y axis.

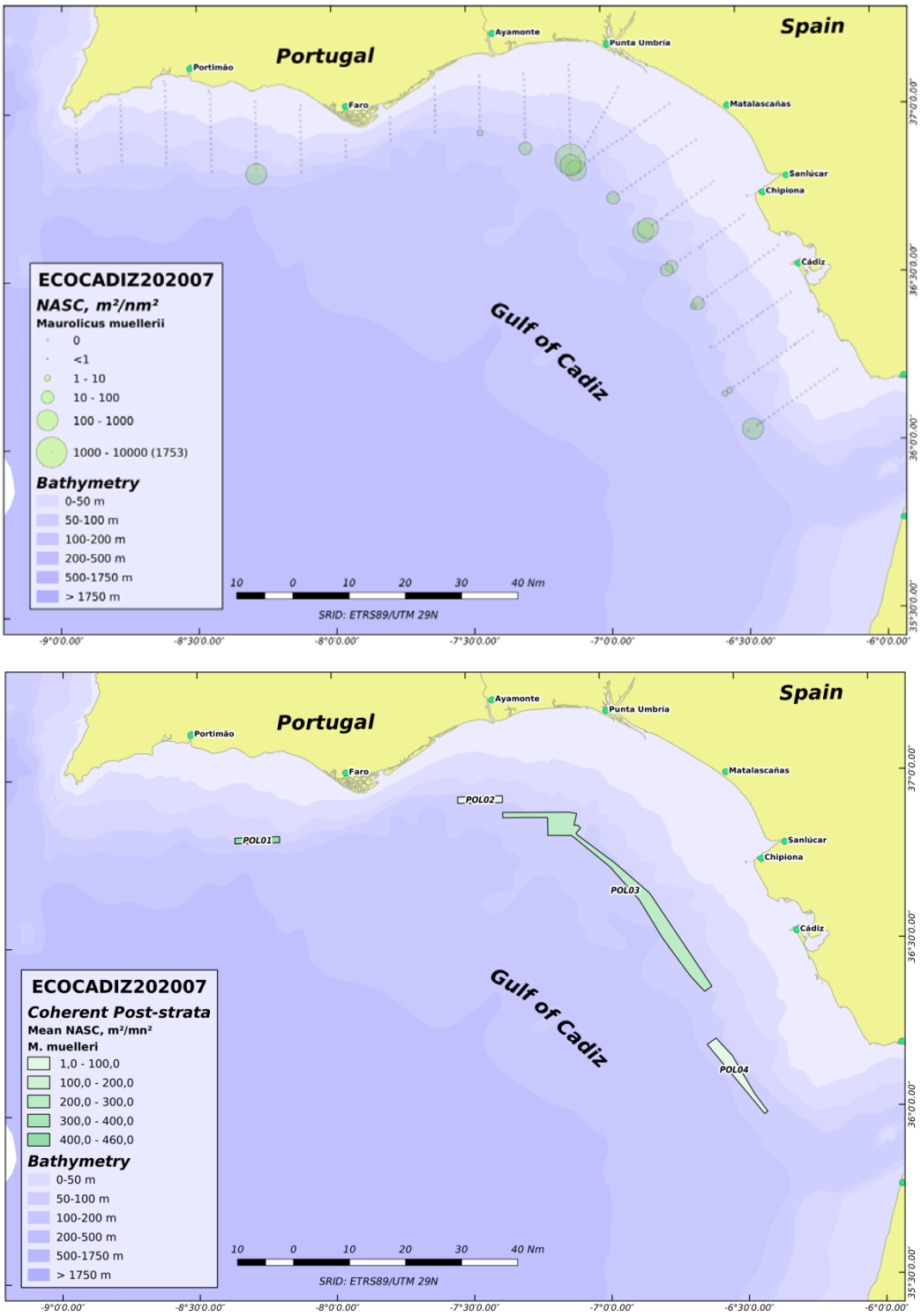



**Figure 43.** *ECOCADIZ 2020-07* survey. Pearlside (*Maurolicus muelleri*). Top: distribution of the total backscattering energy (Nautical area scattering coefficient, *NASC*, in $m^2$ $nmi^{-2}$) attributed to the species. Bottom: distribution of homogeneous size-based post-strata used in the biomass/abundance estimates. Colour scale according to the mean value of the backscattering energy attributed to the species in each stratum.

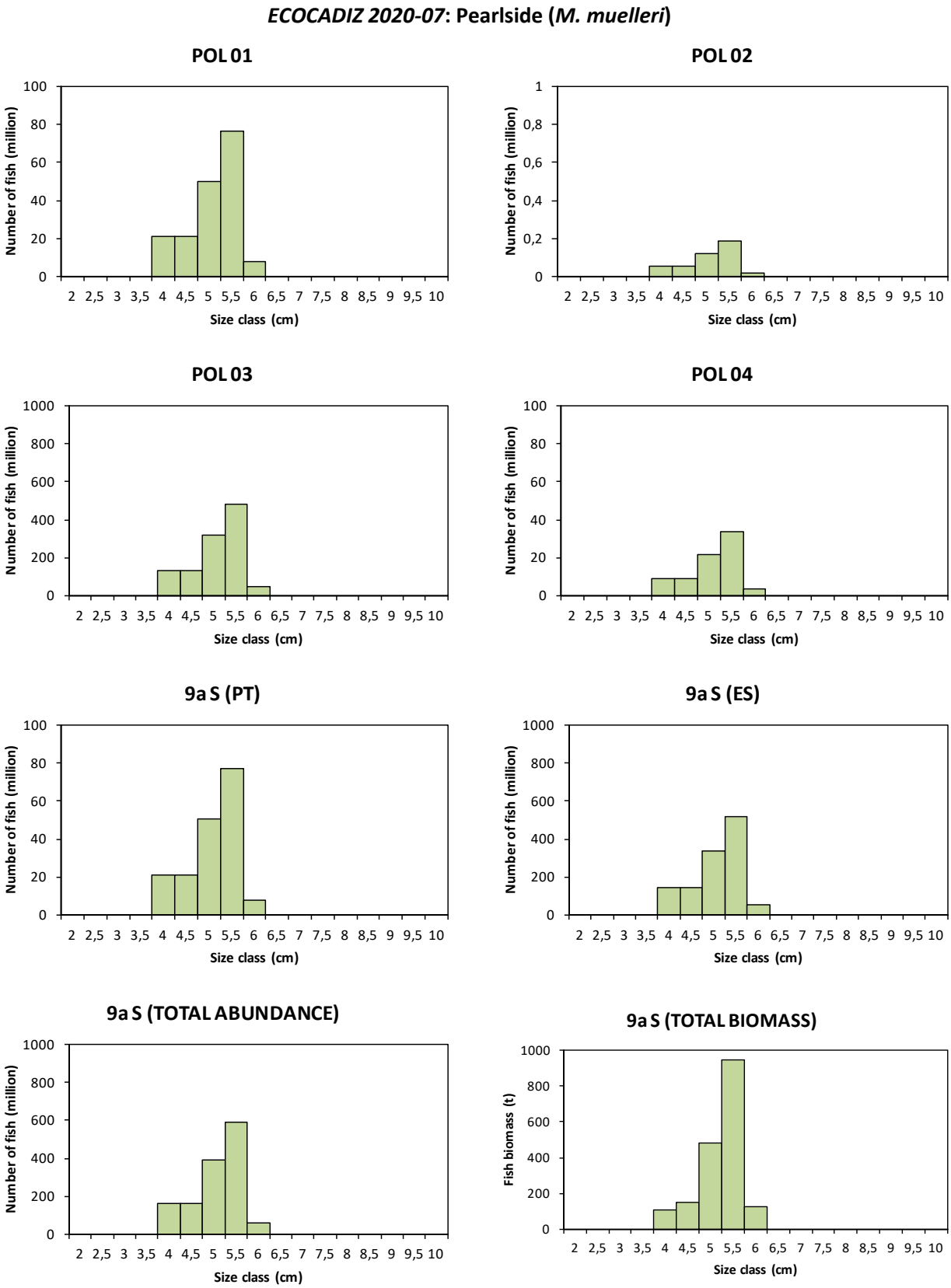



**Figure 44.** *ECOCADIZ 2020-07* survey. Pearlside (*Maurolicus muelleri*). Estimated abundances (number of fish in millions) by length class (cm) by homogeneous stratum (POL01-POLn, numeration as in **Figure 43**) and total sampled area. Post-strata ordered in the W-E direction. The estimated biomass (t) by size class for the whole sampled area is also shown for comparison. Note the different scales in the y axis.

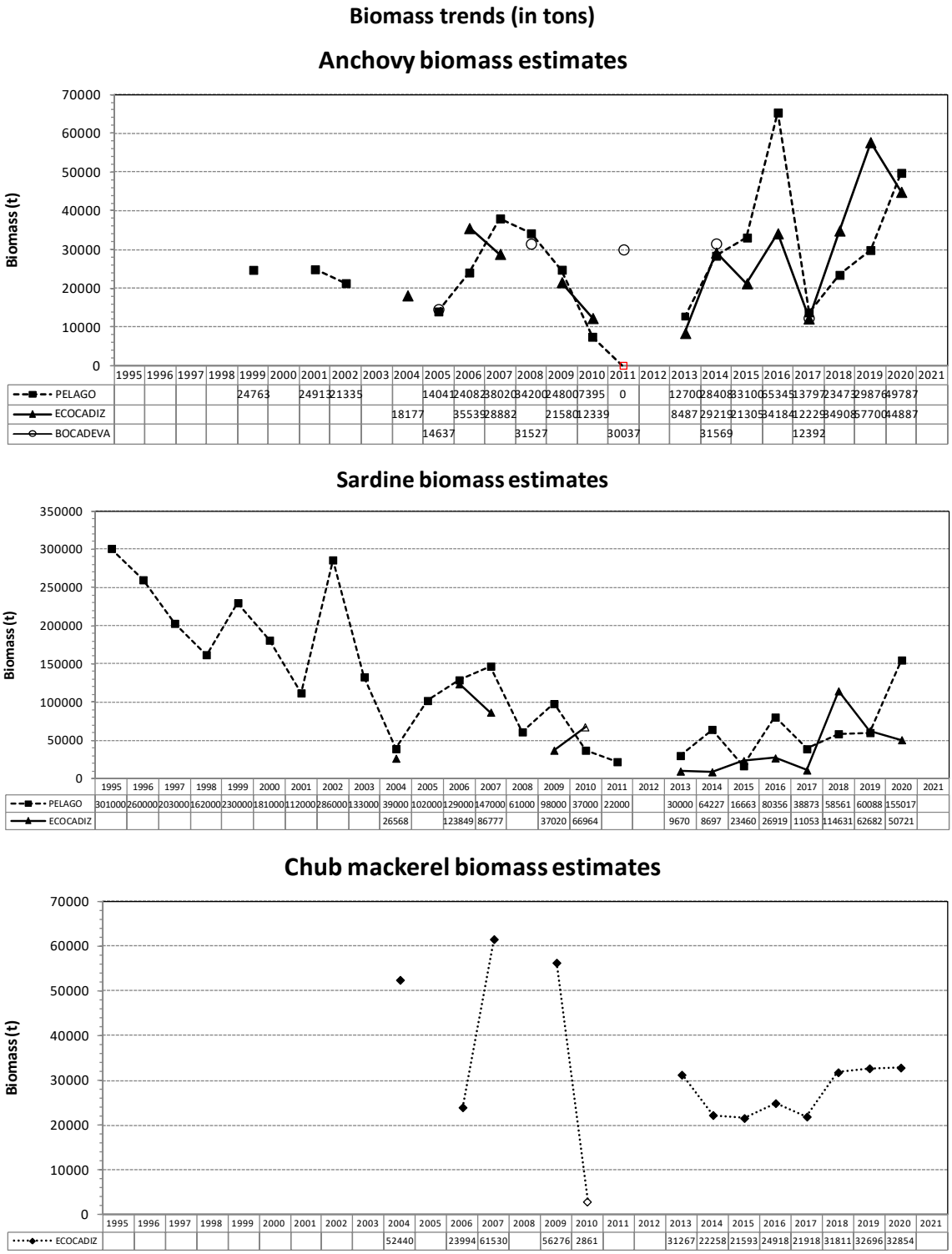



**Figure 45.** Trends in biomass estimates (in tons) for the main assessed species in Portuguese (*PELAGO*) and Spanish (*ECOCADIZ* and *BOCADEVA*) survey series. Note that the *ECOCADIZ* survey in 2010 partially covered the whole study area. The anchovy null estimate in 2011 from the *PELAGO* survey should be considered with caution.